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ACHARYA PRAFULLA CHANDRA RAY

A COLLECTION OF WRITNGS

ACHARYA PRAFULLA CHANDRA RAY

A COLLECTION OF WRITNGS

57

Vol. V-A

Social Reform, Education, Industry & Business, Science, Letters & Correspondances & Press Statements

Editor
Prof. Anil Bhattacharya

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Prafulla Chandra Rây

Dedicated to
Leader of Acharya Prafulla Chandra Ray's articles

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Preface

This is the fifth volume *of Acharya Prafulla Chandra Roy Rachana Sankalan,* the project that the University of Calcutta developed in collaboration with Acharya Prafulla Chandra College, to commemorate the 150th birth anniversary of the Acharya. The volume comprises two parts: one in Bengali and the other in English. It has systematically collated Prafulla Chandra Roy's writings and speeches on social reforms, education, literature, science, commerce and industries, as well as his correspondences with dignitaries of the time. It helps us to understand the man in a holistic manner.

The Acharya was a teacher and scholar par excellence; he advocated self-reliance; he stood for forging a link between industry and academics; he was a relentless nationalist who sought to combine nationalism with social reform; he envisaged a nation-building process for our country that would be able to meet the challenges of modernity. At a time when globalization is constantly infringing on our indigenous base of polity, society, economy and culture, the thoughts and ideas of the first Palit Professor in Chemistry of our University are increasingly assuming relevance in our fight to create a better world to live in. The volume should generate considerable interest amongst the reading public.

I take this opportunity to put on record sincere thanks to Professor Anil Bhattacharya and his dedicated team without whom this volume, like other preceding volumes, could not have been published. In this commercial age the dictum of 'Labour of love' does not carry much weight. But Professor Bhattacharya and his colleagues have proved themselves to be exception to the rule.

Suranjan Das
Vice-Chancellor
University of Calcutta.

Editorial Note

In the second part of the 5th Volume of Acharya Prafulla Chandra Rachana Sankalan all the remaining articles including 'Autobiography' of Acharya P.C.Ray are being published. This volume contains the articles of the Acharya on Social reform, Education, Industry & Business, Science and Technology and correspondences he made with Rabindranath Tagore, Mahatma Gandhi, Subhas Chandra Bose, his other associates including his beloved students and their replies. The Speeches of the Acharya delivered on various occasions on education, politics, social reforms and press statements made by him are included in this volume. A few Photographs of different times have also been incorporated in this volume.

"The world knows Acharya Prafulla Chandra Ray as a great chemist, but the fact he could wield a pen as powerfully as he could handle a test tube would be revelation to those"; any reader will appreciate the justification of this remark even today.

'A lesson for India'(1909), 'Report of the Industrial Commission'(1919), Science & Civilisation(1920), Swadeshi & Economic Salvation(1933), Radhacharan Pal- a study (1931), Medical Education & Research, Foundation of a Key Industry in India(1938) , Drain of Minerals & Wealth of Bengal, 'The bearing of Meghnad Saha's on the problems of Cosmic evolution' (1922) are a few amongst the long list of topics which have been included in this volume.

The articles have been collected mainly from the libraries - eg. Central Library of the Calcutta University, Library of the Rabindra Bharati University, Library of the Mahajati Sadan, Library of Bangiyo Sahitya Parishad, Library of the Prsidency College, Calcutta, Library of the Scottish Church College, Rammohan

Library, National Library, National Library Archives, Library of the Science College, Calcutta, Library of the Indian Statistical Institute, Kolkata, Library of Bangiyo Bigyan Parishad , Library of the Asiatic Society, National Education Council, Library of the Bengal Chemical and Bengal Library. A few materials have been received from personal collections. We owe our special debt to all of them and their praiseworthy role are gratefully acknowledged.

It will be discourteous for us if we do not mention the praiseworthy and inspiring role of Professor Suranjan Das, Vice-Chancellor of the University of Calcutta for the help he has rendered for making possible the publication of this volume.

We acknowledge the noteworthy role of Prof Dhrubajyoti Chattopadhyay, Pro-vice Chancellor (Academic), Professor Mamata Roy, Pro-Vice Chancelor (Finance & Business Affairs), Professor Basab Chowdhury, Registrar and Sri Pradip Ghosh, Press Superintendent, Calcutta University. The role of Professor Sumitra Sarkar, the Librarian of the Central Library of Calcutta University is to be specially mentioned for his valuable suggestions and cooperation.

Prof. Pratip Roy Chowdhury and Prof. Jayasree Deb helped in proof reading. Dr. Saktibrata Bhowmik, Principal, A.P.C. College, New Barrackpore helped us much and their contributions are also gracefully acknowledged. The credit for printing this volume goes to M/S. Gita Printers and the role of Sri Goutam Basak for typing the manuscripts is noteworthy to be mentioned.

Inspite of our best efforts if any error (typographical, printing and others) crept in inadvertently–the responsibity would be lying on us and we seek apology in advance. Comments and criticism from the readers will be highly appreciated.

Anil Bhattacharya

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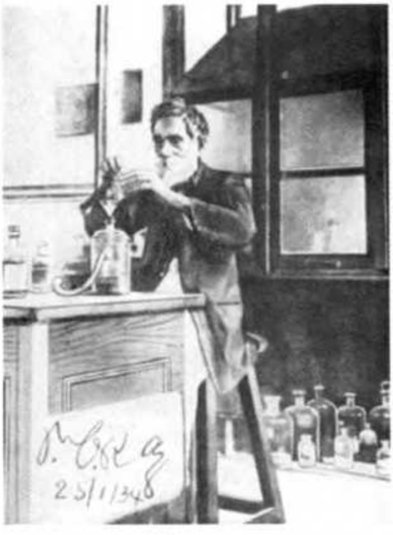
ACHARYA RAY IN 1896.

ACHARYA RAY WITH ACHARYA JAGADISH CHANDRA BOSE
(With some students of the Presidency College, 1907)

(By courtesy of the Principal, Presidency College, Calcutta)

ACHARYA RAY AT THE BENGAL CHEMICAL AND PHARMACEUTICAL WORKS LTD.
(With some distinguished visitors—1932)

(By courtesy of Shri Kanchan Mukherjee)



XXVIII : Acharya Ray
(Laboratory, Bengal Chemical and Pharmaceutical Works Ltd., Maniktala, Calcutta — 1938

(By courtesy of the Manager, B.C.P.W.)

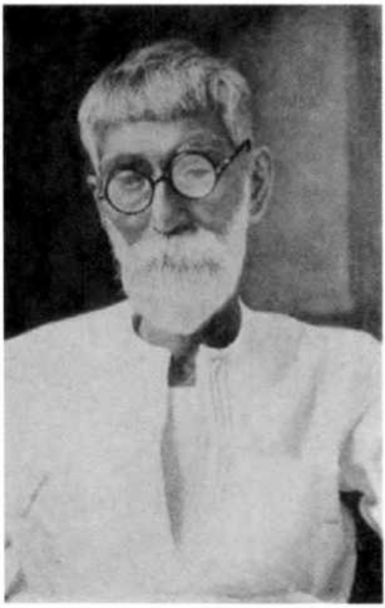
Acharya Ray with delegates of the Indian Science Congress.
(On the occasion of its Silver Jubilee Session in 1938)

Acharya Ray with Justice Manmatha Nath Mukherjee at a function in 1940.
(L.-R.)—Bhabes Chandra Ray, Dr. Pramatha Nath Banerjea, Justice Manmatha Nath Mukherjee, Acharya Ray, Dr. Syamaprasad Mookerjee, Arabinda Sardar.

(By courtesy of Shri Kanchan Mukherjee)

ACHARYA RAY IN 1940

(*Photo* — '*Statesman*')



ACHARYA RAY IN 1941

ACHARYA RAY READY FOR EVENING CONSTITUTIONAL (1941)
(*From the Calcutta Municipal Gazette*)

Swadeshi & Economic Salvation

The gorgeous vista of a federated India to which John Bright referred more than half a century ago has been floating before our imagination and at last is on the eve of materialisation. The Feudatory States occupy one-third of the area of this vast peninsula and harbour in their bosom one-third of her population. 'The wave of Nationalism and Swadeshism which is very much in evidence in British India can no more be kept out of the "India of the Rajas" than Canute could command the surging tides of the ocean to recede. When therefore I received your kind invitation to open this Exhibition, in spite of numerous preoccupations and the infirmities of age. I could not but respond to it. The more so as Sir Swamp Chand Hookum Chand, under whose auspices this Exhibition has been organised is one of our foremost captains of Industry, lie or his Firm owns, manages or controls perhaps the biggest jute mill on the banks ol the Hugli , his Electric Steel Works located in the suburbs of Calcutta is a wonder and puzzle even to me—a student of physical science. Long before we in India realised the potentialities of Swadeshi Industries, Sir Hookum Chand's far-seeing gaze saw the importance of starting cotton mills. His industrial activities are not confined to his own homeland—I mean the Maharaja Holkar's territories, but spread over the whole of India. Calcutta and Bombay bear as much eloquent testimony of his abounding energy and business capacity as his own Indore.

In order that the spirit of Swadeshism may permeate every section of the community it is much to be desired that Exhibitions of this type should be organised at intervals. From time immemorial India has been noted for her line arts and the products of her cottage industries. The patrician ladies of ancient Rome took pride in bedecking themselevs with gems and pearls and wearing the famous Dacca muslin. Indeed, Pliny the historian laments the drain of wealth to the East. Even up till the 17th and 18th centuries the "wealth of Ind" continued to excite the envy and cupidity of the poet and the adventurer alike. But as stam power began to supplant manual labour the tables were turned. The heavy protective duties with which England practically crushed out of existence our weaving and spinning home-industries need not be detailed here. It will be sufficient to quote these few lines from Romesh Dutt's *Economic History of British India.*

"The process of the extinction of Indian manufactures went on, however, under the new arrangements; in 1813 Calcutta exported to London two millions sterling of British cotton manufactures.

British manufactures were imported into Calcutta on payment of a small duty of 2 1/2 per cent., while the import of Indian manufactures into England was discouraged by heavy duties ranging up to 400 per cent, on their value."

It is no use, however, crying over spilt milk, and wringing our hands in blank despair. We must wake up and shake off our habitual lethargy and make vigorous efforts not only to revive our lost industries but start new ones. I am glad to find that notable success has been achieved in this direction by individual private efforts, *e.g.*, pen holders and nibs for steel pens, 'lead' pencils, carbon paper and ribbons as manufactured at Karachi, flash lights, as also batteries for the same, rubber shoes, oil-cloths, "Swan-back"' waterproofs, soaps of superior quality are now in evidence. How much partial success has been achieved in the preparation of Chemicals and Drugs need not be dwelt upon, as I naturally feel some delicacy here. However, a visit to the stall of the Bengal Chemical will, I hope, give one a faint idea of it.

Spread of Western Luxury

Even more than a century ago (*i. e.* 1830-32) we read the following edifying evidences. "In that part of India", the Commons' Committee asked the witness. Holt Mackenzie "where the greatest number of British residents are found, has there been any increase among the natives in the indulgence of English tastes, fashions and habits ?

"Judging from Calcutta" replied Holt Mackenzie," there has been, I think, a marked tendency among the natives to indulge in English luxuries; they have well-furnished houses, many wear watches, they are fond of carriages, and are understood to drink wines."

Macaulay further improved upon it when he observed in course of his famous speech in the House of Commons in 1833 : "We must do our best to form a class of persons Indian in blood and colour but English in taste, in opinion and intellect."

Fully a century has elapsed since then and thanks to the rapid means of communication, the habit of luxury, which in India comes to the same thing as living beyond one's own means, has permeated into the remotest hamlets. Even the peasantry are mad after Western gaudy tinsels, with the result that they are under the crushing and groaning load of a heavy recurring debt. Some of you will remember that Lord Curzon once administered a well-merited rebuke to our Feudatories assembled at Delhi, saying that they have acquired the taste for buying carpets from the Tottenham Court Road (London : Maple & Co., etc.) while their own artizans who make carpets of exquisite design and superior quality are starving for want of support. The same fate awaits most of our artizan classes. Delicate fine workmanship of ivory, and filigree work on metals of intricate inimitable pattern scarcely find patronage from our princes and *raises.* They are now left to the tender mercies of the American globe-trotting curio-hunters.

The influx of cheap machine-made articles of foreign make has made havoc of our handicraft industries with the result that millions of spinners, weavers, blacksmiths and almost every class of artizans have been robbed of their bread and thrown out of employment thus increasing the pressure on the land. And as the sowing and reaping of the crops occupies only a fraction of the year, there is an appalling wastage of human labour. The following short extract from an account of peasant life during the slack seasons in the agricultural (*i.e.* non-industrial) countries in Middle Europe may be of interest as shewing how the people utilise their time when no outdoor work is possible. "The easiest time for the peasant is midwinter. Then he is obliged to stay inside, and while he mends pots and pans, does a bit of carpentry and sharpens sickles, knives and saws *women are spinning, weaving and even embroidering."*

The Bombay Cotton Mills at best give employment to 3 or 4 lacs, as do the jute mills on the Hughli: and the Cawnpur mills find occupation, it may be, for another couple of lacs. Utmost two millions earn their bread in the industrial centres of India, but what of the remaining 318 millions? Will you wait till Manchesters, Liverpools. Glasgow's and Dundees spring up here and transfer 80 per cent, of-the rural population to the urban areas? Are you going to industrialise rural India? With the exception of Calcutta and Howrah there are no towns in Bengal. The District towns are only towns in name; they are the localities where the law-courts have sprung up and they support a parasitic population. I am afraid you will have to wait till doomsday. Apart from the question of the desirability of bringing about this happy consummation, have you, my Westernized brethren, even shown sufficient capacity for it? Why then all this tall talk about opening up of big industries and relieving congestion?

Spinning and Weaving

After all, India is an agricultural country and must ever remain so. The problem is how to increase the productivity of the soil by improved methods of agriculture, and how to suppliment the scanty income of the dwellers in the villages by the introduction and encouragement of subsidiary occupation. I hold that spinning and weaving are the two parts of the one cottage industry which admits of universal application in India.

A simple calculation will show the immense potentialities of the 'Charka' for which Colebrooke pleaded hard more than a century and a quarter ago. The population of India is 320 millions. If a fraction of the millions in the villages—say only one-eight—were to earn only 2 pice (a pice = one farthing) a day the total would amount to 80,000,000 pice or Rs. 12,50,000 per day, which works out to 365×12,50,000 or Rs. 45,50,000 per year. Industrialists now-a-days talk of mass production; but in India we have to count population in masses, hence earnings by the teeming millions, however insignificant they may appear at the first blush, when calculated in mass, amount to crores. The well-known aphorism in the "Hitopadesa" (Salutary Lessons)—

i.c. a single blade of straw is by itself very weak, but bundles of it when twisted into a rope are strong enough to bind a mad elephant—holds literally true here.

I have said somewhere that I am a strange contradiction. As a chemist I have been a lifelong test-tube holder and my keenest pleasures have been derived from my experimens with my beloved pupils in the recess of my laboratory and even now I consider a day misspent if I cannot spend 4 to 5 hours there. Yet somehow or other I am regarded as a pioneer in starting some of our industries. Students of Zoology know well that the Royal tiger of Bengal (my close neighbour in the district of Khulna) as also the cat belong to the same family; the tiger is called a magnified cat. So there is some sort of family relationship between Sir Hookum Chand and myself; only the former is of the Royal tiger type while my humble self is only a cat or rather a kitten. Yet I have been a stauch advocate of the spinning wheel and have always prided myself on being the unworthy disciple of Mahatma Gandhi in this respect. In most part of Bengal there is but one crop—(the *aman* paddy)—9 months in the year the peasants sit idle; whereas taking the average of the whole of India full six months are wasted as being the non-crop season.

Utility of Exhibitions

To me swadeshism has ever been synonymous with patriotism—it has been a part and parcel of my religion and the very breath of my nostrils. A Swadeshi Exhibiton has no meaning unless and until we take a vow to use aritcles of indigenous origin, even if they happen to be a little coarse or ungainly in sight. Glass chimneys which used to crack readily have decidely improved and no complaint is now made on that score. Genuine home-made hurricane lamps now greet our eyes. An Indian who simply from his arm-chair indulges in cheap sneers at the feeble efforts of our self-sacrifying men in making such articles as enumerated above is in my estimation a *traitor* to his country.

It is very happy sign that exhibitions of indigenous products are being held all over India at frequent intervals. The greatest credit belongs to those public-spirited men who take upon themselves the arduous task of raising funds, gathering exhibits from various places, making an attractive display and inducing a large number of people to attend. I should say that credit is no less due to the visitors. Their main attraction is not *tamasha,* nor an opportunity of bargain. There is no allurement of the gambling booth or of vulgar amusements. yet I find people coming in thousands, often from distant places at considerable personal inconvenience. I have not the least doubt that a growing love for swadeshi goods and a healthy curiosity for learning what such goods are, account for the keen interest evinced by visitors.

The function of bazar or market is to bring the buyer and seller together, and the relation between the two is generally of a transitory nature. The buyer comes to purchase specific articles, or to ascertain their price, and goes away after satisfing his immediate need. An exhibition servs a much wider purpose, although the result may not be tangible and the transaction in the stalls may be insignificant compared with those in a regular bazar. The visitor comes to an exhibition more to see the variety of goods displayed than to buy any goods in particular. But when he goes back, he carries in his mind an impression of things that have interested him, and turns into a prospective buyer. Thus an exhibition is a collective advertisement with a far-reaching effect, and its educative value is immense.

Exhibitions, are not modern institutions in the country. From time out of mind, India has been holding innumerable melas as regular function. The great Kumbha Mela is not a mere religious gathering, but is also a concourse of vendors and buyers. Its origin can be traced back to the periodic congress of sages called by ancient Indian monarchs. The annual Hariharchhatra Mela of Bihar is mainly a commercial gathering and is regarded by many as the biggest fair in the world, exceeding in magnitude even the celebrated Nijni-Novogorod fair of Russia. Of modern institutions, the Leipzing spring fair is the largest annual function devoted to the display of engineering goods. A similar fair has been organized in England under the name of Olympia where different groups of manufacturers exhibit their products in turn every year.

The Swadeshi mela or exhibition is new idea which has developed to meet a specific need which our people are beginning to feel actuely. It is not a function for the display of ordinary goods. We have no dearth of bazars and shops. The kerosene depot, the sewing machine agency and the cycle store are now ubiquitous. Dazzling fabrics of artificial silk, Bata's foot-wear, *"Eveready"* torches, dainty wrist watches, elegant spectacles for beautifying the face, and an immense variety of fountain pens of which every self-respecting young man must have half-a-dozen assorted have penetrated the remotest towns. What more do we require?

It gladdens one's heart to see this array of exhibits representing the effort of our own people. Perhaps some of the products are not up to our expectation, perhaps a few cost a little too much. Will it be a bad bargain to perfect these things to those we have been familiar with? I have no hesitation in saying an emphatic "No". Buy what you can get, offer criticism if you can, but not in a carping spirit. The more you buy, the greater will be the production and the number of producers. By an inevitable natural process, there will be emulation among producers, they will become more and more skilful and efficient, and at a no distant date only the most deserving of them will survive. I have noticed this process leading to highly satisfactory results in the case of serveral industries in Bengal and other provinces.

A Swadeshi exhibition, like the one we are attending creates public enthusiasm and enables us to take stock of our industrial backwardness as well as activities. It is a powerful means of stimulating love for goods produced by our own kitth and kin. Let us foster this love in every way and turn it into an instinct which would be proof against the lure of cheapness and dazzle of foreign goods. Such an instinctive love would be a more effective protection than any kind of control artificially imposed by the state.

Vigorous propaganda work is necessary to bring home to our people the huge incessant drain of wealth from our land due to importation of foreign commodities. It has been estimated that in 1925-29 four crores of rupees worth of artifical silk was imported with the result that the once-flourishing silk industries of Murshidabad and Maldah are threatened with extinction. Some other articles of imported luxuries are given below. Motor Cars inclduing taxicabs exceeding 4 crores; cigarettes 2 crores; total of cotton manufacturers including twist and yarn 63 crores; drugs and medicines 2 crores; chemical $2\frac{1}{2}$ crores. The figures from 1930 onwards have not been given as owing to the universal trade depression the purchasing power of the people has been considerably diminished.

When our students go home to their villages they should turn into propagandists of swadeshi. Above all they must *practise* what they *preach*. To you, our patriotic youngmen, should devolve the noble task of being missionaries in this field. Remember in the adoption of Swadeshi lies our economic salvation.

---

* Address on the opening ceremony of the Swadeshi Exhibition, Indore, January 12, 1933.

Courtsey : Prafulla Chandra Roy Museum–Science College, Chemistry Dept. C.U.

My Message of Swadeshi

When one visits an exhibition in a European country a kaleidoscopic display of multifarious samples and patterns greets his eye—he is simply bewildered at the variety of articles displayed. It takes a long time to do justice to a simple wing of the exhibition. When, however, a genuine Swadeshi Exhibition is opened in India, the sight excites one's commiseration at the poor show it offers and this is the reason why I am almost in agony of despair when I go through the table of imports from foreign lands. For instnace from 1927-28, India imported among other things, besides textiles and sugar which taken together amount to or even exceed 70 crores :–

Cigaretttes, (3-4 crores); drugs and medicines (2 crores); vehicles, mechanically propelled, (including motor cars) (6 crores); motor cars only ($3^1/_2$ crores)

Drugs and medicines we cannot do without and certainly can not be included among articles of luxury and this is the branch of industry which my humble self has the honour to represent.

Let us now turn for a moment our attention to the state of things a century ago in Bengal about which I am naturally more competent to speak. Not only was she a self-contained province as far as her clothing was concerned, but she was in a position to export her surplus product. I am not going to inflict on you the thrice-told tale as to how the ruin of this important industry was brought about. It will suffice to quite only one or two short extracts, which have not found their place in recent standard works. e.g., Romesh Dutt's "Economic History of India".

"All the thread is spun by women who generally employ their leisure hours in the business.

"The English Factory appears to have been built about the year 1666 when Indian Muslins were first introduced into England.

"Two crops of cotton are raised in the district. These are gathered in April and September.

"The Empress Noor Jehan greatly encouraged the manufactures of the country, and under her patronage the Dacca Muslins acquired great celebrity. They became at this time, the fashionable dress of the Omrah at the Imperial and Viceregal Courts of Hindusthan, while the finer fabrics, so exquisitely delicate, as to be styled in the figurative language of the East "webs of woman wind", "abroan", "running water", or "Shubnem", "morning dew", were exclusively appropriate to adorn the inmates of the seraglios. Throughout succeeding times the Dacca Muslins have maintained their high reputation, and even in the presnet day, not withstanding the great perfection which the art of weaving has attained in Britain, these fabrics are unrivalled, and in point of transparency, beauty and delicacy of texture are allowed to excel the most finished productions of the loom in any country in the world.

"The spinning of thread afforded employment of all ranks and classes of inhabitants of the district in former times. This branch of industry began to be affected in 1824, when British yearn was first imported into the district, and since 1828 it has been in a rapidly declining state.

"* * * * * * but the balance of trade being then greatly in favour of the district, specie was imported direct, and in this way the Arcot rupees appears to have been introduced into the eastern parts of Bengal. The exportation of cloths of different parts of Hindusthan was also very extensive in former times. The annual investments for the imperial wardrobe at Delhi and for the Viceregal court of the province monopolized the whole of the finer Muslins.

"The manufacture of thread, the occupation in former times of almost every family in the district is now, owing to the comparative cheapness of English thread, almost entirely abandoned, and thus the arts of spinning and weaving, which for ages have afforded employment to a numerous and industrious populaton, have in course of 60 years, passed into other hands that supply the wants not only of foreign nations, but of the rivalled country itself.

(The above extracts are from Taylor's "Topography of Dacca)"

What I said about Bengal applies *mutatis mutandis* to your own province as well. It is only necessary to add that the very word Muslin is derived from Mausalipatam. Then again, take another important items of consumption e.g., sugar. So recently as 1871 Bengal used to supply not only her own needs of molasses and sugar but was in the favourable position of exporting refined sugar to London.

Says Westland in his *'Tessore'*

"Although sugar is manufactured to some extent all over the district, the principal sugar country is the western part, which may be considered as included between these places :—Kotchandpur, Chaugacha, Jhinkergacha, Trimohini, Keshabpur, Jessore and Khajura; and these places are principal marts for its production and export. There are two chief places to which is made,—Calcutta and Nalchiti, Nalchiti is place of great commercial important in Backerganj; a sort of central station for the commerce of the eastern districts. The demand there is for "dhalua" raw sugar as it is for local consumption; and except from Kotchandpur itself, almost all the "dhalua" sugar produced in the distrcit find its way to Nalchiti or to Jhalkati, which is near it. Kotchandpur also sends a good deal of "dhalua" sugar there, but most of its produce goes to supply the local demand in Calcutta, as it is favourably situated for land carriage to Calcutta. Calcutta has in fact two demands, namely, a demand for "dhalua" sugar for consumption in Calcutta and other places whither it sends the sugar, and a demand for pucca (refined) sugar for export to Europe and other places. This last demand is met by Keshabpur, and by most of the other places in the southern half of the district. The former demand is, as stated, already met by Kotchandpur."

To-day India imports some 15 crores of rupees worth of Java sugar, of which again nealry half falls to the share of Bengal.

It will thus be seen that though we have been close upon two centuries under British rule, economically we are retrogressing day by day, inspite of the much advertise *Pax Britannica,* and the costly Royal Commissions with which unhappy India is so often saddled. Witness the Royal Agricultural Commission which for all practical purposes has come to nothing except the creation of a few fat berths.

Let me now for a moment diagnose the disease with which our yougnmen have been infected and which stands in the way of our industrial progress.

The college-bred yougman would start business if he were accommodated with a big capital, a furnished room in a city with a secretariat table and an electric punkha over his head and of course a motor-car waiting outside. He would, of course, like to be dressed *a Europeanne in Bideshi* clothes. No wonder, such a nincompoop should rot all his life as a clear drawing the respectable sum of Rs. 25 per month. Andrew Carneige, who began his career as a telegraph-message boy and rose to be a multi-millionaire and a philanthropist, has as his opening lines in his suggestive book "The Empire of Business"—"It is well that young men should begin at the beginning and occupy the most subordinate positions and they should be introduced to the broom and spend the first hours of their business lives sweeping out the office. I was one of those sweepers myself."

Henry Ford, William Morris, Eastman of "Kodak" fame are all innocent of academic acquirements and they are unanimous in the opinion that a university qualification is rather a handicap to the success in an industrial career as it makes havoc of originality and initiative.

"Take again the case of the biggest soap-manufacturer in the world. *About forty-five years ago a fresh-faced, stocky, Lanchasire boy stood behind the counter of a small grocer's shop in Bolton. There was nothing about him to attract special notice except his eyes. They were of a brilliant, gleaming, arresting blue. No one could be quite ordinary who has such eyes. No artist could have caught all their various lights. That boy was one day to be the Viscount Laverhulme. I had this descripton twenty years ago from a very old Bolton man who knew Willaim Lever and his father well. The boy is now a merchant prince, and one of the richest and most adventurous men in the British Empire.

* * * * * *

'I look back more thatn fifty years. The young Lever's short period of education was soon to be exchanged for a busy life.

—Lord Birkenhead : "Contemporary Personalities." p.277.

The late J. N. Tata, no doutb, crossed the threshold of the Elphinstone college, but he read there only for a short time. At any rate, he learned nothing of electricity and metallurgy and yet to him we own the two big industrial concerns—the Jamshedpur Steel Works and the Bombay Hydro-electric Installation. I suppose Sir Hukumchand will not take it amiss if I say that he knows nothing of electricity or science and yet the only successful electric steel-welding works located near Calcutta owes its existence to his pluck and resourcefulness. I am never tired of repeating from many a platform that it would have been a evil day for Bengal if Sir Rajendra Nath Mookerjee had come successfully out of the Engineering College at Shibpur. Had he got the mystic alphabet B. E. suffixed to his name, he would have at best vegetable all his life as a district engineer on the respectable salary of Rs. 600/- a month. He would certainly not have been the foremost Bengali captain of industry.

If I here indulge in a bit of autobiographical digression I hope I shall be pardoned. Some forty years ago, when I started the Bengal Chemical with Rs. 800/- in my pocket—the hard savings of three years' service—I had only this idea working upon me that, something I must do to find employment for the chemists manufactured in our universities.

Our college educated science graduates, instead of hankering after 25 to 30 rupees worth clerkship would do well to run tanneries on a small scale. I have to repeat the same deleful tale as far as the Bengalis are concerned. In the suburbs of Calcutta known as Tangra and Beliaghata, there are some 250 small tanneries run entirely by Jut Mussalmans and Chinese. They play a lucrative trade. It is, however, very much to be regretted that though the Calcutta University has been turning out year after year hundreds of B. Sc.'s M.Sc.'s and a few D.Sc.'s too, they are as helpless as new born babes owing to lack of initiative and pine for miserably paid berths.

Your province has always been a pioneer in the tanning industry.

Avaram tannel leather which is known as "half tanned leather" is exported to Europe in large quantities.

Madras is also the pioneer of chrome tanning in India and prossesses a very large chrome leather factory at Chromepet which claims to be the biggest chrome tanning concern in the East. This tennery is under Messers. Chambers & Coy. It manufactures upper leather for boots and shoes, sole leather, and various sorts of Industrial leather and leather goods. There is also a chrome tannery at Bangalore, one at Trichinopoly and a third has been recently started at Madras. The products of all these concerns enjoy well deserved reputation.

As far as tanning is concerned Madras occupies a place of honour not only in India but in the world's tanning trade in which such words as "Bangalores, Trichis, Coconadas etc., are household words among the users of Indian tanned leather.

The "half-tanned leather" about which I spoke is produced by illiterate *camars* who have got hereditary traditional skill. If, however, our science graduates would only acquire the requisite technical knowledge these half-tanned hides and skins could be exported in the perfectly finished condition and additional crores of rupees could be earned.

It cause me, as a chemist, deep anguish of mind to find that over 14 crores worth of oilseed (chiefly groundnut) is exported abroad from your province, out of India's total export of $26^1/_2$ crores of oilseeds. The total weight of the oilseed exported comes up to 12 lakhs of tons. When it is remembered that nearly 2/3 of the weight representes oil-cake which is a valuable cattle-food as also a manure, the loss to the country is simply incalculable. Moreover, the oil extracted from it in the foreign lands e.g., Holland, Belgium etc., when hydrogenated, returns to us as vegetable ghee, which we have to buy again at a far higher price. How utterly helpless we are!

The one remedy which has hitherto suggested itself to our leaders and educationists is the multplication of universities. Create new universities and manufacture graduate *ad infinitum* and unemployment will be removed. Evidently they proceed on the homeopathic principle ;

simila similibus curantar. Within the last few years two new universities have been created in your own province and I seriously question the wisdom of those who are responsible for them. Take again the United Provinces. Formerly, the university of Allahabad used to cater for the entire province, but now we find that you have some half-a-dozen additional ones which have sprung into existence mushroom-like. I need not enumerate them. A very thoughtful article appeared sometimes ago in the columns of the leading, admirably conducted and well-informed jounal of your city from which I shall take the liberty to quote a short extract, which will throw a flood of light upon what I am going to essay.

Under the heading. "The Educated Unemployed" we read ; "Since the War, there has also come about in Central Europe, as elsewhere a widespred desire on the part of the lower classes for higher education. The result has been an annual production by the universities of what is called intellectual proletarians,—hybrids for whom there is no place in the classes of employment to which they aspire. As a result they mostly go to swell the ranks of they aspire. As a result they mostly go to swell the ranks of extremists. **** The lack of occupational outlets, the swelling of the rank of the educated unemployed and the keen competition for what little is available, have resulted in frequent student riots and race conflicts",—*T. M. Kumaruppa, The "Hindu", March 13, 1930.*

As you are aware, emigrant Chinese swarm over Malaysia. An American writer of note thus thrown a side-light on the economic condition of that penninsula. "Penang, from the lines of bullock carts unloading rubber on the harbor front to the streams of pleasure cars (about ten Chinese to four British and one Indian) pouring along the magnificent highway to the 'the peak' we find to be one of the busiest hives in South Asia. Like Singapore of Rangoon, it is an outstanding illustration of how the western is bringing together the races of Asia in great cosmopolitan cities, originally to labor for him, eventually to untile to push him out. Chinese run the small business, docile black Tamil and their scarlet clad and tinsel bederked women do the heavy work".

Again the same author thus describes the state of things in the Malaya Peninsula and lays strees on the fact that mere academic culture is a handicap in the way of building industry.

"In the Straits Settlements and nighbouring territory, Chinese have been able to gain a dominant positon not only in trade, but also in production. Withness the tin industry. Under the stable law, reasonable taxation and just adjudication of their disputes as found in such places, the Chinese out-trade and out-produce every other race on the globe.

"Nevertheless, it would be well to remember that in these foreign places, the founders of this Chinese prosperity are men who went there in humble circumstances, many of them as coolies. By virtue of qualities which make a man leader of his gang, these men began to rise. Freed somewhat from the handicap of innumerable relatives they had money to invest. Soon they could take a small contract. They remained close enough to their men to know which were capable foremen, which could take on greater responsibility, which were restrained by fear and which encouraged by success. They built up their organisation as they went along. Probably they lerned to read enough English or Dutch to gain something of an outlook concerning their business. At the end of a long and industrious life they had so developed the rules and customs by which the business was conducted, that an elected president, or manager, could continue successfully along the lines laid down for him.—*Baker : "Explaining China", p. 180.*

Again : "Scholarly China has failed to produce industry"—*ibid p. 18.*

Mind—the Tamil begins as coolie and remains forever a coolie; whereas the Chinese collie ends as a *dollar-milionaire.* No wonder, many more rich rubber-plantations are owned by the Chinese than even by the Europeans. This further illustrates that academic culture creates only swelled-head do-nothings.

Although I am intimately connected with half a dozen industries in Bengal, I have always been a stanch advocate of the Charka. Let me again repeat, perhaps for the hundredth time, some of the reasons which led me to plead for the spinning wheel.

The craze for industrialisation has seized many of our publicmen, but the example of Europe and America ought to be an eye-opener, as has been well-said—"Half the people in industrial from it in the foreign lands e.g., Holland, Belgium etc., when hydrogenated, returns to us is vegetable ghee, which we have to buy again at a far higher price. How utterly helpless we are !

The craze for industrialisation has seized many of our publicmen, but the example of Europe and America ought to be an eye-opener, as has been well-said—"Half the people in industrial countries are racking their brains in devising labour-saving appliames and the other half in solving the question of unemployment". The latest figure in England is nineteen lakhs, while according to Mr. Thomas there were over three millions unemployed in Germany and half a million in Italy and the unemployment figure in the United States was given as from three to six millions.

After all, barely two million hands find occupation in the mills and other industries. Look towards Bombay and Calcutta, where a few capitalists thrive and lakhs of sweated labourers, living in the Mums and chowls, drag a miserable existence, where the infant mortality rises from 400 to 500 per thousand. I have often drawn attention to the fact that in several parts of Bengal rice-mills are being started. No doubt such mills line the pockets of the proprietors ; but one such mill is the means of snatching away bare morsels of bread from scores of destitute widows. The Manchester School of Economics had a good time of it for close upon half a century from the time of Cobden to that of the nineties of the last century. They were under the comfortable delusion that all other countries in the world would remain forever backward, supply raw-materials and Lancashire alone would flood them with finished piece-goods. But now not only the continental countries, but even China and Japan, not to speak of India, have got cotton-mills of their own with the result that Messrs MacDonald and Lloyd George are at their wit's end to solve the unemployment riddle.

Cigarettes, automobiles, toilets, gramophones. gewgaws and tinsels in the shape of toys, electric torches and sundry other things which *dazzle* our eves and capture the hearts of our youngfolk, are articles we can do without to a large extent.

To the students of economics, Madras is known as a comparatively poor province : but the foreigner who visits your city and finds the show-rooms exhibiting fashionable motor cars would run away with the idea that verily this is a province overflowing with gold.

" Not one man in every ten who runs a Motor-car to-day can really afford it if he looks to the future"

Judge Crawford, who has long been noted for his outspoken criticisms of modern extravagance, especially as shown in the possession of a Motor-car, made further scathing remarks at Edmonton-county in mail week, when he laid down the dictum quoted above.

At Barnet. 12 months ago, he declared that ''even a County Court Judge has no right to buy a car unless he has private means, because his salary alone (£. 1.500 a year) is not sufficient".

"There is gross extravagance all round now-a-days", he added, "and the great bulk of the people who come into court are living beyond their means. As has been said, people marry on credit and live on judgement summonses".

He thought it "scandalous that a working girl should wear gloves at 4S11-3/4d a pair", and when told that her shoes cost over £.1, her hat 133s IId., and her coat 5 guineas, he said, he felt, "shocked to think that the clothes of a working girl should cost so much".

If the above applies to wealthy England how forcibly it should appeal to our own countrymen whose average income does not exceed two to three annas a day. In fact the craze for fashion and luxury which is infecting our youngpeople is like the tubercular bacilli corroding our vitality.

I have, of late, been conducting an extensive investigation on the total amount of food stuff grown in India. One would naturally think that fertile Bengal has a large surplus of rice. Unfortunately. as far as she is concerned, there is a deficit of one maund of rice per head per year. Mr. Latif in his " Economic Aspect of the Indian Rice Export Trade" also arrives at the same conclusion. According to his computation based upon official returns, the total quantity of rice required for use in India is 33.51 millions of tons approximately, whereas the total yield in ton is only 32 millions and he concludes that "but for the relief which Burma rice gives to the people of India, the consequences would have been disastrous.

No wonder that Lieut. Col. McCarrison of the Pasteur Institute, Coonoor, in his memorandum submitted to the Royal Commisson on Agriculture should authortatively state : "of all the disabilities 'from which the masses in India suffer, malnutrition is, perhaps, the chief. The more spectacular, endemic and epidemic, diseases such as Cholera, Malaria, Dysentery Tuberculosis and Leprosy kill their thousands yearly; but malnutrition maims its millions and is the means whereby the soil of the human body is made ready for the rank growth of the pathogenic agents of many of those diseases which afflict the Indian people. * * * Malnutrition is thus the most far-reaching of the causes of diseases in India". It will thus he seen that the articles of luxury we indulge in is in exchange for morsels of .bread—leading to malnutrition.

On this ground Mahatmaji has very properly all along insisted' that the Charka is the only machinery suited to the rural area. Mr. Jack speaking of a district in East Bengal says that "the timetable of the cultivator, when his land is unfit for jute, fhows three months' hard work and nine months' idleness". The district from which I come grows only one crop in the year known as the *aman* paddy and the peasants live absolutely idle lives for full nine months in the year. A secondary occupation would prove a god-send to them.

I am a born Swadeshi and I am glad that you have named this exhibition as "Swadeshi Exhibition".

I have disliked the word "boycott" and I have always avoided in my speeches and writings the use of this term. Boycott means a resolve not to use the foreigner's manufactured goods, so that he may be financially a sufferer. By bringing pressure to bear upon his pocket

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he may be brought to his senses and made to grant concession. "Boycott" is thus for a specific object and the object being gained its *raison d'etre* ceases and it is called off; whereas 'Swadeshism' is based upon pure love of one's country-made products. I am Swadeshi and Swadeshi is my religion and it has been my life-long end to manufacture those articles which I have to import from foreign lands. Political consideration does not sway me.

What Swadeshi can achieve can be illustrated in a few words. As soon as the recent movement began, the rich and the poor—the masses and the classes—as if by the waving of the magician's wand forsook the cigarette and took to the *biri* with the result that thousands of loafers and unemployed who finding no occupation took to *goondaism* are now working hard at the making of the biri. In the bye-lanes of Calcutta and in every nook and corner you find groups of youngsters sitting in a circle and -briskly plying their fingers at the new handicraft and earning as much as a rupee or more per day. I do not as yet know how far this new spirit has pervaded your province. I *do* hope the contagion has spread everywhere. If our people would only take to *biri*, three to four crores of rupees, which used to be drained out of the land, would be distributed among the masses.

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* Address at the Swadeshi Exhibition, Madras, July 15, 1930.
Courtsey : P. C. Ray Museum, Chemistry Dept. C.U.

Swaraj as Handmade of Swadeshi

Within the last few months I had to undertake the pleasant function of opening the exhibitions in connection with the National Congress at Lahore, as also the Swadeshi League at Madras. To day it is my privilege to perform a similar function as your kind invitation.

I naturally attach special importance to the Exhibition inaugurated by your Association, because as you rightly point out, it is the first attempt of its kind to organise an Exhibition of classified trades, and Indian manufacture goods. Moreover in this Exhibition, chemical and medicinal preparations are to occupy a prominent place in its stalls.

As one intimately connected with the latter industry, I might be expected to speak with some degree of confidence as far as this line of business is concered, Bombay occupies the proud position of being the pioneer in the field of textile industry; moreover, in the Indian world of commerce and trade, she has always occupied the premier position and has been an exemplar to the sister provinces.

As early as 1886 long before we learnt to appreciate *Swadeshi,* one of the foremost of your industrialist and philanthrophists named one group of his mills as the Swadeshi Mills, just as another great son of your presidency belonging also to the same great community, held aloft before us the ideal of Swaraj as our political goal.[1] Now these twins—Swadeshi and Swaraj are on everbody's lips. If we claim Swaraj as our birth-right, no less Swadeshi should be our creed.

The "Swadeshi" movement, that was started in Bengal after the partition of the province by Lord Curzon, meant, in the words of Mr. Harris, the cultivation of the doctrine that the resources and the industries of India ought to be developed by the Indians themselves. How this movement had its repercussion in Bombay is worth repeating. The promoters of the Tata Iron Works failed to raise the requisite capital even in the London market and were in despair; when to quote the biographer of Tata : "All India was talking "Swadeshi", and was eager to invest in "Swadeshi" enterprises. 'From early morning till late at night the Tata offices in Bombay were besieged by an eager crowd of native investors. Old and young, rich and poor, men and women, they came, offering their mites; and, at the end of the weeks, the entire capital required for the construction requirements, £ 1,630,000, was secured every penny contributed by some 8,000 native Indians."

I was a passenger in 1920 per "S. S. Loyalty" along with my friend Dr. Jivaraj Mehta and some two hundred other Indians and I well remember how our hearts swelled with pride at the enterprise thus inaugurated by the Scindia Steam Navigation Co. As early as 1893 the late Mr. J. N. Tata decided to build up a line of Steam-Ships of his own. He began sounding shippers as well as mills whether they could bind themselves down to secure him for two years a certain amount of freight. All were gratified at this courageous enterprise which Mr. Tata embarked upon single handed for the greater good of the industry and for thus putting down the combine of the local navigation companies. Eventually to place matters on a business footing, Mr. Tata obtained a written guarantee from those who had consented to ship their goods exclusively in the new Japanese line of steamers. When this great move was an accomplished fact, there was a consternation in the camp of the combine.

So they set up a counter move. They followed the vultar trade trick of breaking down this formidable opposition by means of a ridiculous reduction of freight. From rupees 13 and 11 per cubic ton to Hongkong and Shanghai respectively, the brought down the rate to the ruinous figure of rupees two! The P. & O. Company went on better and attached freight at the nomianl rate of a Rupee! It was indeed a trial a strength, a regular war of freights between a powerful combination and a single person of indomitable courage and equally strong to bear the loss. The war would have ended in the complete triumph of Mr. Tata and for ever have destroyed the monopoly of freight. besides teaching an object lesson never to be forgotten. But unfortunately the tempting offer of the ridiculous rate. tantamount of free freight, was irresistable to the largest shipers who, to their eternal discredit, broke their argeement. The example was contageous and the signatories droped ne after the other.[2]

I am by no means indulging in utopian dreams when I say, that at no distant date, we hope to have not only coastal steamers but ocean going vessels also of our own, manned by Indian captians and Indian crews.

A generation has passed away since then. There has been a world-wide revolution in ideas and we are marching through the track of centuries in almost as many years. I hope the Scindia Steam Navigation Co., will have the moral and material support of every Indian shipper.

In all countries, notably in Japan, the national government comes forward with subsidies and state-aided bank accommodations and facilities. Here in our unhappy land we have to fight single-handed, not only against tremendous odds, but also against the bureaucracy allied with the powerful British interests,—witness the treatment meted out to Mr. Haji's Bill.

Addressing a Bombay audience of merchant-princes and industrialist I have to apologise if I have at all to refer to state help and is connection with the promotion of nascent industries. I cannot, however, avoid giving expression to my bitter pangs in this respect. I am intimately connected with a Pottery Works as also with an Enamel Works. That we are at all able to keep our head above water is due to the sacrifice and infinite patience of our share-holdres and directors. England which loudly proclaims the blessings of free trade imposes 25 per cen protective duty on enameleed ironware. We in India while asking for bread get only stones. We have to make bricks without straw.[3] But the Swadeshi spirit roused in us must go to supply the function of bounty and state-aid. Swadeshi is nothing but another phase of patriotism.

Emerson in his "Representative Men" says :

"The race goes with us on their credit. The knowledge that in the city is a man who invented the rail road, raises the credit of all the citizens. But enormous populations, if they be beggars, are disgusting, like moving cheese, like hills of ants or of fleas—the more the worse."

In this connection I cannot withhold my meed of admiration for the great Parsi community. Out of a pouplation of 320 millions the followers of the prophet Zoroaster do not come up to even a lac—they are but a drop in the bucket. Yet they count; they are the pioneers in the textile industry, their community has produced the foremost philanthrophists. I have myself been the receipient of their princely charities in connection with the Khulna Famine in 1921 and the North Bengal Flood in 1922. They have always been in the forefront of political activities. It is their community which has produced a Dadabhay Naoroji, a Pherozesha Mehta and last but not least a Nariman. A little over a year ago when I was in Bombay. I could not help sheding tears of grief at the sight of the denationalised and anglicised Parsis habited in the European fashion and of course in Bideshi clothes and their ladies dancing in the clubs in their ball-dresses and not disdaining of quall glasses of champagne. But now in the twinkling of an eye what a change in the mentality is slowy, but silently creeping over them, thanks to the talismanic influence of Mahatmaji and what is still more wonderful, although they might think that they would be simply swamped by the teeming millions on the attainment of Swaraj, they have not at all been in a hurry to extort from us fourteen or twice-fourteen points before they could make up their mind to plunge headlong into the Swadeshi movement.

I must confess to my shame that, in spite of our high patriotic sentiments, we in Bengal have been slow to imbibe the ideals held aloft by Mahatmaji. Sreemati Mira Bai's strictures are well deserged. She could not help expressing her sorrow at the sight of the majority of young men and young ladies attending her lectures in Calcutta at which Khaddar was not much in evidence.

In one respect however, we in Bengal can claim to be ahead of other provinces as far as the discarding of Bideshi cigarettes is concerned. Throughout the province—*bidi* has taken its place even among the higher classes. Thousands of unemployed loafers are now plying their fingers at the new handicraft of making *bidi* and earning as much as a rupee per day. I do not know how far this spirit has permeated in your province. In fact the use of *bidi* may be taken as a barometer of Swadeshi-ism at least in one aspect. A penny saved is a penny gained. The universal use of *bidi* alone would enable us to prevent the draining away of 3 to 4 crores of rupees every year.

Chemical Industries—Their Immense Possibilities in India

Some 16 years ago the veteran editor of the Moern Review styled your humble lecture as Doctor of Doctors, by which he of course meant the father of Doctors of Science. To-day I find to my infinite bewilderment that year in and year out, Doctors of Science are being manufactured not only in my own laboratory, but my old pupils, holding chairs at the Universities of Dacca, Allahabad, Lahore, and other places,—are producing any number of Doctors of Science. In fact, if a catalogue were to be compiled of my chemical grand-children as Doctors of Science, the number would be found to be simply appalling. And yet we are as helpless as new born babes, as far as chemical industries are concerned.

I am afraid I have just time enough to indicate briefly the broad lines on which we ought to proceed in order to turn to account the geographical features of India, and the inexhaustible raw materials of this country belonging to the mineral, vegetable, and animal kingdoms. It may be that in the chemical industry in Bombay and elsewhere we have brunt our fingers but it should be remembered that failures are precursors of success and the experience gained will stands us in good stead to steer clear of rocks and shoals ahead.

It is commonly said that sulphuric acid is the key to all other chemical industires. Sulphur or some suitable natural sulphide is the raw material used in its manufacture and India unfortunately is not favourably placed regading these. This may be one of the causes why sulphuric acid manufacture in India depending on imported sulphur has not been able to thrive well,—the cost of production being much higher than in Europe or Japan. It naturally follows that the cost of production of other chemicals manufactured from sulphuric acid made here is higher than that in countries where the other chemical is produced under more favourable circumstances. It is a relief, however, to note that the old idea of the supreme importance of sulphuric acid is now exploded.

In Europe and America electricity generated by natural water-power is now being utilized on an enormous scale for the synthesis of various chemicals. Although the falls of Niagara as from the poets' and scientists' points of view have no equal here, yet India is not poor in natural sources of water-power; and when these are more fully turned to account, quite a number of chemical industries should spring up in this country. In fact, many basic or key industries are at present based upon the utilization of electric power.

Numerous chemicals are capable of being manufactured electrically from raw materials available in plenty in this country. To name only a few—calcium carbide may be made from coal and limestone; ammonia and nitric acid from air; carborondrum from charcoal and sand; caustic soda, chlorine, and bleading powder from comon salt.

Aluminium wares and utensils are coming largely into use but the sheets, which, after all, constitue the important item in them have to be imported from America, which has harnessed the Niagara Falls. In 1929-30, I crore and 43 lacs worth of sheets and ingots of this metal were imported. Bombay, and Mysore have now got hydro-electirc installations and there is no reason why we should not be able to manufacture metallic aluminium from the almost inexhaustible supply of the mineral bauxite round about Jubbalpur. Electro-metallurgy, which is again based on the hydro-electric power, should play a prominent part in the future industrial development of India.

Coming to other chemicals not dependent on electricity, we may turn our attention to bichromates from the India chromites; mangnesium chloride from sea-water; stoneware, earthenware, porclain goods, and refractory bricks from India clays. India-rubber goods for which there is a growing extensive demand, should also claim our attention—it is *pre-eminently a chemical industry.*

Although the manufacturer of dyestuffs is almost a close preserve of Germany, there is no reason why some of the intermediate products at least should not be made in India. If the distillation of coal be more carefully conducted in this country, we should lose none of its benzene and allied hydrocarbons, which can be converted into aniline and other easily made products.

Having a plentiful supply of drungs like nux vomica, belladonna, datura, podophyllum, tea waste,—there is no reason why we should not proceed to manufacture the active principles of these, e.g., strychhine, atropine, podophylli , caffeine, to meet our requirements as well as that of the whole world.It is worth while finding out whether it will be possible, by private enterprise, to manufacture quinine from cinchona grown in India, and successfully compete with Java. In oil bearing raw materials India, perhaps, stands foremost, and I dream of the day when we shall be exporting soaps to also the outside world. The other important raw ingredient bamely caustic soda can be manufactured electrolytically as explained above. I am by no means sure if we really require an artificial substitute for ghee, but if we at all do, why should we not ourselves hydrogenate our oils instead of importing so-called vegetable products? There are various leaves, herbs, fruits and flowers growing plentifully india from which valuable essential oils may be made. The manufacture of glue is an old industry in India, but no attempt has hitherto been made to produce the finer grades which are indispensable for the match industry. Until a suitble supply of mineral phosphates is discovered we might convert bones into superphosphates or more profitably into phosphoric acid.

Then again the importation of artifical silk piece-goods it increasing at an alarming rate and the market is being flooded with them. From Rs. $7^1/_2$ lacs in 1921-22, it has jumped up to Rs. 330 lack in 1928-29; there is no dearth of cellulose as represented by cotton and wood pulp and other raw materials; and chemists and engineers ought to be harnessed in solving the problem of its manufacture in India.

In this connection I may add even at the risk of ceaselesss repetition that the college-educated young man often turns out to be a hopeless failure, Merchant-princes and captains of industry in Bombay and

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elsewhere have been as a rule self-made and self-taught men. Thomas Edison had only a nominal schooling. When about 8 years old he was sent to school. Three months later his teacher sent him home with a note saying that he was too stupid to teach. At 14 he became a news boy selling magazines and papers in railway trains. He had a small laboratory on the train. Finally he set fire to the train and the guard threw him out and his bottles after him. Also, he boxed the boy's ears so hard that he had been deaf ever since. Eastman of Kodak fame earned his living as a clerk in a bank and taught himself chemistry in his windowed mother's kitchen. Benjamin Frankin to whom we owe the lighting conductor and who was equally great as a deplomatist and scientist had only 2 years of school life. The found of the Sunlight Soap Works—Viscount Leverhulme had only a few years learning at a grammer school.

Such instances may be multiplied *ad-infinitum.* In starting a successful business what is wanted is grit, tenacity of purpose and infinite patience; unfortunately these are the very qualities which academic culture makes short work of. The later Mr. Pierpont Morgan, the American banker, once said : "I can hire any expert for 250 dollars and make 250 thousand dollars with the information he gives me but he can't make the money himself and he can't hire me to do it for him.' That is the reason why I do not set much store by the chemical Doctors of science. They can be yoked or harnessed in a team and driven by the born captain of industry.

India is a vast country and sources of raw materials are often at a very great distance from the places of manufacture, with the result that the cost of raw materials become prohibitive unless we have cheap transport, It is the duty of the State of aid industries by arranging for transport at the least possible charge.

By "Swadeshi" we mean, that we shall be national in our outlook, tastes and ideas. Not that we will eschew everything foreign. We shall take in what is good and real from other countries and assimilate them into our own. We shall not be transformed by foregin ideals and customs but absorb them into our own. The days of exclusiveness have gone by. We must exchange thoughts and ideas amongst the peoples of the earth and at the same time retain our own individuality as a nation.

We must be national before we can be internation. The two are, in fact, bound up together. This national outlook—the spirit of love for one's country is the spiritual,—the idealistic significance of Swadeshi.

Coming to material plane by Swadehi you are asked to patronise goods manufactured in your country. I shall ot dwell on the economic benefits of this form of Swadeshi. They are too patent to need description. Its connection with Swaraj is also evident. For what improves the economic conditions of the people is a help to the attainment of Swaraj. This aspect of Swadeshi is also indirect.

But the principle of Swadeshi enjoins you not only to prefer and buy goods made by Indians but also to take an active part in their manufacture. However grim our determination may be to eschew foreign articles, it cannot last long. Our, chief aim ought to be the production of those articles of daily use which are cannot do without. In fact vigourus efforts should now be made towards this end. There is a tide in the affairs of men which, as the immortal poet says, leads on to fortune. Such a tide has come for our economic salvation and we must make most of the psychological moment.

In productive industries the moral and intellectual qualities of a people are brought into play and developed. The habits of patience, industry and punctuality, administrative ability and expert knowledge are forstered. These qualities which are essential to the success of a manufacturing business fit people for Swaraj also. Industry is thus a direct impetus towards Swaraj.

Take for instance hand spinning and handloom weaving. If every man and woman has the determination to spin and really spins for the production of cloths, Swaraj will be gained in a day. For, the amount of self determination and devotion which this implies will soon bring us political freedom. For a people of such moral fibre cannot long be denied political freedom.

So also in managing big manufacturing concerns, other qualities are brought into play. This moral and intellectual side of Swadeshi are even more important than the economic aspect.

What is the reason? It is the industrial habits of the people. They make the people more self-reliant and independent. They know better how to fight in the industrial sphere. They have greater powers of organisation and self control.

Take for instance, the case of Bombay. She has shewn a grit and self-sacrifice which other provinces may well emulate. We in Bengal are fast degenerating into a race of quill-driving automata.

So Swadeshi is in the truest sense a Handmaid of Swaraj. Not there are not other ways by which these qualities are developed but industry (or constructive Swadeshi) is one of them.

We also know by experience that some of those who spent their lives in organising industries are taking a very successful part in the national movement.

It is distressing—nay shocking sight to me to find our educated young hopefuls going about in *Bideshi* clothes and dressed in the European style—vertable *jack-daws* in borrowed feathers smoking *Bideshi* cigaretters. For the time being we must be prepared to use indigenous stuffs—even if they are of somewhat inferior quality. Pardon me, gentleman, if I am led to use strong language. He who knowingly uses Bideshi articles discarding Swadeshi ones is guilty of high treason against his motherland.

Notes

1. The Swadeshi Movement, "India for the Indian," showed sings of progress. To some the term was tittle but a political shibboleth, to others it was an expression of patriotism. Thee who were bent upon the advancement of the country realized that revial of indigenous industries would prove more serviceable than agitation. * * * With these objects in view, he founded the "Swadeshi Mills Company, Limited." *"Life of J. N. Tata" pp. 49-50.*

   "Before the term "Swadeshi" became a political cry, Mr. Tata had adopted the name for one of his mills. In a sense he watned "India for the Indians." *ibid, pp. 277.*

2. I need scarcelyh add that the above is taken almost word for word from the very illuminating sketch of Tata by Sir Dinshaw Wacha.
   It may be added here that myself, though a poor school master and some of my friends in the Directorate of a pigmy inland Steam Navigation Company, have incurred heavy due to this sort of unfair rate-cutting. It is needless to add that our rivals were a powerful British Company.
3. Cf. "The House of Common yesterday (June 8, 1929) passed a resolution imposing a safe-guarding duty of 25 per cent for five years on enamelled ironware.
   "Sir Philip Cunliffe-Lister, President of the Board of Trade, recalled that the original dutty had been imposed in 1922 by Mr. Lloyd George's Government. When it lapsed in 1924 foreign imports had increased, but no to such an extent as to persuade the Safe-guarding Committee in 1926 to advise the re-imposition of the duty. The present claim before the idential committee had now succeded, because new evidence, including satistics of the census of production, had been adduced, showing that 6 out of 18 firms in this country had been comelled to close down."

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* Address on the classified Trade organisation, Bombay. August. 25, 1930.
Courtsey : P. C. Roy's Museum, Science College. Calcutta University (Chemistry Dept.)

The Charka—its Immense Economic Possibilities

When I am requested to take part in or to address an organization which has for its object, the removal of the economic distress prevailing in our country, I cannot but respond to the sacred call, unless I am pre-engaged, it is on this account that I appear before you on this occasion. During the present year I have had to address meetings at Lahore, Madras, Bombay, Poona and elsewhere and thus travel throughout the length and breadth of the land,-close upon 18,000 miles. I am however never tired, like my Great Inspirer, Mahatma Gandhi, of my favourite theme—the Charka and its immense economic possibilities.

I know there are even now a school of economists who comfortably sitting in their arm-chair in the heart of towns and ignorant of rural India, quote their catch phrases and shibboleths from Adam Smith down to Marshall and look upon India as if it were England or Germany or the U. S. A. I do not know whether it is necessary seriously to refute these academic prigs and pedants but shall content myself with presenting to you certain stern facts and naked realities.

The first thing which one has to bear in mind is that India is an agricultural country with teeming millions, struggling with appalling poverty. Since the last 60 years or more Dadabhai Naoroji and his successors have been busy with statistics proving that the average income of an Indian does not exceed one anna to two annas. Exactly half a century ago the late Sir William Hunter who had an intimate knowledge of the economic condition of rural India authoritatively stated that one-fifth of the population of India did not know the pleasures of a full stomach. Since then matters have drifted from bad to worse. In fact, semi-starvation and consequent malnutrition is the rule rather than exception with our vast population.

Charka and Unemployment

In India, as in China, where we have to deal with seething masses of humanity, the replacement of handmade articles of daily use by their machine-made substitutes has resulted in bringing untold woes on the people. Let us take the most important item of our imports, namely yarns and piecegoods for which we have to pay an annual tribute varying from 60 to 70 crores. A century or more ago, India was not only not subjected to bear this heavy drain of her wealth but was in a position even to export muslins, calicoes and yarns of fine counts. It is on this account that Mahatma Gandhi whose heart bleeds at the sight of the misery of the masses has laid special stress upon Charka. The Charka and the weaver's shuttle necessarily go hand in hand.

What an in exhaustible supply of man-power is allowed to remain unutilised and to run to waste! Some of you may have noticed that in the streets of Madras, heavily laden carts, dragged by human beings competing not only with bullock carts, but also with motor trucks. The same wonderful sight is seen in the busy quarters of the city in Calcutta. The fact is that any earning, however small it might be, is better than no earning. If one would only earn half anna a day by turning the spinning wheel, his income would be increased 25% thereby as his average income does not exceed two annas a day. Taking the population of India at 32 crores and assigning five members to each family on an average, if each family were to earn only half anna a day by plying the Charka, the total earning would amount to exactly 73 crores per annum.

" After all, the Bombay mills employ only $3^1/_2$ lakhs of hands and as many are employed by the jute mills of Bengal. In fact, taking all the industries in India, not more than a million and a half or at most two millions earn their livelihood from this source. But India has a population of 320 millions. Even if you double or treble the number of mills, barely a fringe of the population will be touched. Our efforts should therefore be directed to find subsidiary occupation during the slack or no-crop season.

or I am by no means enamoured of the mills, as an immoral atmosphere always pervades the area where they are situated. Drunkenness" and its attendant vices follow in their wake. Nay more. The congested dwellings and slums in which the working men and women are huddled together, lead to frightful consequences. The women who have to leave their children behind with none to look after them find it convenient to drug them with opium. No wonder that in those over-crowded, squalid dwellings from which air and sunlight are practically cut off, the infant mortality often runs as high as 400-500 per thousand.

Our efforts should henceforth be directed to keep the peasants attached to their rural, and both physically and morally healthy homesteads.

The following accounts of peasant-life during the slack seasons in the agricultural (i. e. non-industrial) countries of Europe, e, g. Jugo-Slavia may be of interest is showing how the people utilise the time when no outdoor work is possible. In Bengal both the Hindu and the Moslem women being purda-ridden are precluded from taking part in any kind of outdoor labour (not so however, in your province); whereas it will be seen that the women-folk of Europe materially help in earning an extra income over and above their household duties. '

The whole family rises at the first sign of dawn, and after, some hot coffee and bread start work. The peasant, his grown-up sons and male helpers go to work in the fields—wheat, corn, rye, oats, maize, millet, and buck wheat (the latter as an autumn crop) are grown; potatoes, peas, turnips, beans, beetroots, cabbage and cloves, planted everywhere, but only rich farmers go in hop.

* * * *

While the husband is busy in the field, meadow or vineyard, the wife packs her big basket to go to market with. It is about a yard long and carried on the back. In it she carries fresh vegetables, some fruit and perhaps a loaf or two of homemade bread always eagerly bought in town, and when the long basket is nearly full she squeezes a short round basket at the top. Sometimes she carries eggs in it, but mostly a good many hens.

* * * *

The easiest time for the peasant is midwinter. Then he is obliged to stay inside, and while he mends pots and pans, does a bit of carpentry and sharpens sickles, knives and saws, WOMEN ARE SPINNING AND EVEN EMBROIDERING.

Mr. Calvert in his valuable work "The Wealth and Welfare of the Punjab" estimates that the average cultivator in that province barely finds work for 150 days.

Mr. Jack, also speaking of Backerganj in East Bengal, says—

"The time-table of the cultivator, therefore, when his land is unfit for jute, shows three months' hard work and nine months' idleness ; if he grows jute as well as rice he will have an additionaHiix weeks' work in July and August."

It is wrong to believe that to take to the Charka is necessarily to decry machinery. Far from it. The Charka itself is a machine and may easily be recognised as such. Gandhiji also wants to see machines going, with this reservation only, that the machines be not utilised ultimately for oppressing the poor and helping the greed of the rich. That is what the Charka and Gandhism stand for. That is the meaning of the stamp of the spinning wheel on the national flag. India stands for the brotherhood of humanity; the Charka on the national flag says so.

Although I have been a devoted life-long student of Science during the last half a century and although the laboratory has been not only the scene of my activity, nay even the solace of my life, I have nevertheless realised the significance of Mahatmaji's weighty words, addressed to me some nine years ago and repeated by him now and then.

"I know that you have by your scientific researches have made our country look taller by several inches but the service you are now rendering by devoting your attention to popularising handspinning in Bengal is much greater than any you have yet rendered." I confess, I almost feel abashed in having to quote the above words.

As some of you may be aware. I have not failed in my humble way to help the starting of chemical industries and have just, at the request of the sacrificing and patriotic editor of the *Bombay Chronicle*, contributed an article in the Special Congress Number of the esteemed journal on the chemical industries which should be at once started on the Bombay side. I have often said to myself that it is a paradox, nay a strange irony that my humble self who happens to be a bit of an industrialist should also be a disciple of Mahatmaji in preaching the gospel of Charka. I hope, I shall be pardoned if I tell you in confidence that you have just snatched me away from my no less congenial task of seeing the installation of perhaps the biggest sulphuric acid works in India, in our Chemical Works; if I at all refer to these personal matters it is only to silence those economists'who indulge in academic talks and sneer at our efforts.

Listen to what Mrs. Hardy, wife of the great novelist, in the course of a speech on modern civilization observes :

"To many civilization is synonymous with material prosperity. To them the most highly civilized individuals are they who won a motor-car, who are on the telephone, and have facilities for listening nightly to wireless; they who are able to call to their aid a dozen mechanical inventions for adding to their so-called pleasures and saving their time. This, I take it, is the meaning of civilization to the majority of people.

"Certainly it would be an act of sacrifice—perhaps an uncalled for act—for any individual to be heroic enough to dispense with all such mechanical aids and devices. Nevertheless, when too highly regarded, they are injurious to the best development of humanity. The great danger of to-day is that life may become too mechanised in this age of machine.

"While considering the subject of this paper, my thoughts were irresistibly led to the teaching of Gandhi-Mahatma Gandhi, the Indian reformer, or revolutionary as some might call him. He has a profound disrespect for the achievements of this age of machines, in their effect upon actual human happiness and advancement. His teaching is that the simpler life makes the purer spirit—which is, by the way, remarkably in accord with that of the Sermon on the Mount.

"He is not alone in this. I have heard from the lips of one of the profoundest thinkers of the younger generation the opinion that the only hope for civilization is a return to a simpler life. He was an Englishman. The two men, so wide apart in their lives and outlook upon life, have yet the same ideal a selfless, purity of life and aim and thought, as complete as that taught by the Leader of Christianity.

"That should be the true goal of civilization, if mankind is to benefit thereby, not the accumulation of wealth or power, nor a feverish hunt after so-called pleasure, nor the accumulation of countless mechanical devices which surely must tend to dull and deaden many of the highest faculties ".

Repugnance for Rural Life

The average Bombay or Calcutta graduate earns not more than Rs. 25/- per month, where as in Madras the market value of a graduate is even lower. But the town-bred youth has a marked repugnance for rural life. · It passes one's understanding how a young man often burdened with the charge of a family manages to live on such a bare pittance. In Bombay or in Calcutta, house rent is abnormally high, sometimes even higher than that in London and some other European cities ; it is no uncommon thing to find a whole family housed in a dark, dingy, ill-ventilated room with small partitions separating the two sexes,

If our graduate or under-graduate were to adopt village life, he could live more comfortably even on Rs. 25/- per month as he will not be tempted to take to the amenities, I had almost said, the curses, of modern "civilized" life, namely cinemas, restaurants, races etc. He will not have to dress foppishly while going out, though at home he is in tattered clothes. He could keep one or two milch cows which would not only give the best food to his children but the farmyard manure, as it is called, would be a fertiliser for the land he would cultivate. In Europe, scientific agriculture has at least doubled the productivity of the land. Unfortunately our science graduates never dream of turning their knowledge to account, with the result that the soil' is becoming poorer day by day. Moreover, by living in villages, they will be brought into living touch with the ignorant peasant folk, who are sadly in need of the; first principles of sanitation, and improved methods of agriculture.

Go and see what Sri Raja Gopalachari, one of the noblest sons of India, whose sacrifice is almost! unparalleled and who has dedicated his life to the cause of his dear motherland, has done at his *ashram* at Tiru-chengodu, Salem and seek inspiration by sitting at his feet there as I have done.

Addressing the annual Convocation of the Patna University, Nov. 29, 1930, Mr. Justice T. S. Macpherson, the new Vice-Chancellor, said :—

"I should like to commend to their earnest consideration the point whether the path of duty does not lead towards work in the villages rather than in the towns to which so many gravitate. There is abundance of splendid work open in the mufassil to earnest self* sacrificing youngmen. It will be unostentatious, it will be far from easy, it will involve much discouragement in the pioneer days before the right lines of work have revealed themselves, but it will be of transcendent benefit to the people whose greatest need is to have among them in each neighbourhood a number of educated! men—high-souled yet practically-minded as their leader and their pattern—such men as would bring trained minds to bear on the common things of life in a rural area.

"George W. Russel, "A. E.", the Irish poet, painter, philosopher, economist and editor, recently went to the United States with a message about the importance of making rural life wholesome and fine. His thesis is that a nation which loses its rural population loses its vigor, that people who move to the city lose their energy in about three generations. Consequently, the proportion of farm dwellers must be high, and they must live the best life that can be provided for them.

G. W. Russell is trying to turn the tide of population back to the land. He is advocating for America what he has been advocating for his native Ireland: "farming not only as a desirable way of life but as a necessary way for at least 20 per cent, of any nation's people if that nation is to survive."

Mechanization versus Unemployment

What economic ruin has been brought on the western countries is evidenced by the recent dismal tale of unemployment in Europe and America. Fortunately, a new school of economists is springing up, which has not failed to look deeper into the problem and diagnose the causes of the world wide unemployment malady. About two years ago (1928), *The Statesman* of Calcutta observed: "At present no one has any cure for the incipient manufacturing crisis in the West but restriction of production and consequent unemployment. To select two industries only, America makes as many boots and. shoes in six months and blows as much glass in seventeen weeks as she requires for a year. She must either dump the surplus elsewhere or shut up factories. Lancashire and Yorkshire are in similar plight. Every country hastaken to manufacturing, and machines have increased production many times over. But there is no corresponding increase in the possibility of consumption. The mass of the world remains too poor, and the goods cannot be distributed. Above all in the continents of Asia and Africa material progress has made so little advance that the market is trivial in comparision with the population. The people's wants are few.

An American economist has evidently grasped the situation and bluntly offers the true explanations.

"That a crisis of unemployment is again upon us and that it is of a new and unexpected type, coinciding not with a period of depression, with curtailment of production and the shutting down of industries, but rather with an era of abnormally large production, is asserted by Evans Clark, writing recently in *The New York Times*. Mr. Clark believes that the cause is the great extent to which hand work has been replaced by machinery—a reason to which appeal has been made ever since textile machinery began to be used in England in the last century, but generally pronounced invalid by economists. The rate of replacement, however, has been abnormal of late, and Mr. Clark holds that the consequent inability of the industries to absorb the men whose work machinery is now doing, may well account for present labour conditions." When the American economist wrote the above he did not know that he was playing the role of a prophet in that his words have proved to be too true. Witness the slump, the trade depression throughout the world with its attendant miseries. Allow me to repeat once more what I said the other day at Poona. Too much stress cannot be laid upon the glut of overproduction of machine-made articles.

I have lately been making an extensive study of China as her economic condition is in many respects comparable to that of India. She has a population of 480 millions or 48 crores. Let me quote an American authority by no means very friendly to China.

"Coincident with these processes, railways were throwing out of employment hundreds of thousands of coolie burden-bearers, steamboats on the rivers were taking the livelihood out of the mouths of hundreds of thousands of men who had carried China's inland water traffic in junks and canal boats, and were making useless work of the tens of thousands who had acted as trackers and hauled the old-style ships up the Yangtsze river gorges, Foreign factories were sending machine-made goods into China at the same time, and foreign capital was building modern factories in Chinese cities, thereby helping to destroy the household and small shop industries which had existed with little change for centuries. The combination of these forces created unemployment and want.

Again; "Contact with the mechanical civilization of the Occident has undoubtedly been a tragedy for the Chineses people",—Abend : Tortured China (p. 144).

Listen again to what an eminent cultured Chinese who was educated in Scotland from his childhood and who ranked with the greatest living Chinese thinkers has got to say on this subject.

"But China has not been able to shut the door in the face of the invasion of foreign machines and cheap machine-made goods, and these two invasions, by making idle tends of millions of our skilled hand workers and coolies, have ruined us, just as an influx of millions of Chinese labourers would have upset the American industrial scheme."

Trade follows the flag. Imperialism with its con-comitants, namely, the machine gun and the gun boat, follows in the wake of dumping of cheap goods on the hapless, industrially backward races. In our own country every class of artisans has had its bread snatched away from its mouth—all our handicrafts, one by one, have been ruined. Had there been "any alternative occupation to absorb these artisans, who have been ruthlessly, deprived of their livelihood, there should have been no economic distress.

It is true every province in India has got a Department of Industries which, as belonging to the transferred subjects, is under an Indian Minister. It is however sad to relate that to the Department of industries, the Charka is an anathema. Herein lies the strongest condemnation of the existing regime. When we shall have real Swaraj, and not a travesty of it as at present, ministers who fight shy of lending a helping hand to our struggling industries will be swept away.

The Charka means back to the deserted village. The Charka means pure home life and domestic felicity. In the pre-British days every village was self-contained. The smith, the carpenter, the carter, the boatman, the boat-builder, the brazier, the spinner, the weaver, the pack bullock driver, each had his alloted task in the village unit. Now the products of machine civilization penetrating into the remotest corners have brought about dire consequences.

Mr. Darling in his well known book "The Punjab Peasants in Prosperity and Debt " says " No one can doubt that the supreme need of the country is food, more food, and still more food". It is therefore our duty to bring home to our 320 millions of countrymen that the purchase of a piece of foreign cloth means sale of so much food grains and taking to the Charka means retaining that amount of food grain for home consumption

I have brought with me a specimen of the celebrated Dacca muslin (more than 100 years old). Have the great grand-daughters of those who spun such fine threads, finer than the finest gossamer thread, almost invisible to the naked eye, so degenerated that the deftness of the fingers can no longer be restored? Is the art to be allowed to be lost for ever ? Are we to sit with folded hands and be indifferent on-lookers of the ruin of our idustries ? Remember if we fail in our duty to-day, we shall be arraigned by our children as those who were willing and wanton instruments for the extinction, one by one of all the arts which were once the glory of India.

In conclusion, let me remind you, Exhibitions, of khaddar like these will be of no material benefit to our country unless we take a vow of using khaddar and nothing but khaddar.

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* Courtsey : P. C. Roy's Museum; Science Colege, (Chemistry Dept.) Calcutta University.

The Spirit of Khaddar as I Understand It*

The ideal and the attainment of 'Swaraj' have been intimately associated with the "Khaddar message" of Mahatma Gandhi that at a time like the one we are passing through, when Khaddar stands almost discredited as means of attaining national freedom, I, as one who has worked for the spread and continuity of Khaddar, feel obliged to make a few observations on this very important point. Little over a year ago when I first took upon myself the task of popularising Khaddar, I confess I did not appreciate the spirit of Khaddar in all its bearings till a few months later. At first I remonstrated, argued, and had the matter counter argued by my pupils and friends, as is my wont; and slowly came to me the vision of what Khaddar really stands for. And before going farther, I can make this remark that it stands for a simple and truthful life, a life which is lived on the basis of honest toil, a life in which work is its own wages. Those of our countrymen who believed in Khaddar merely as a political weapon soon found that it means more, it means a whole life time. At first, it would appear, our regard for Khaddar originated from its antiquity, then it was felt that is meant boycott of foreign goods, till now to all who have been able to seperate the chaff from the grain, it means the only thing we should do for the economic salvation of our country. There have been sincere workers who have of late given expression to feelings of disappointment at Khaddar not having been able to give us Swaraj in the course of twelve months. To them the reply is, have we all of us really and truly spun and woven as Mahatmaji insisted upon, and then found it wanting? If we are disposed to regard Khaddar as a political weapon only, have we given it a fair trial?

If, on the other hand, we regard it from the point of view of a real constructive national programme, there ought not to be any abatement of enthusiasim in this direction, provided, of course,we are satisfied as to its utility and feasibility. I confess I do not understand world economics, but I can safely say from direct experience of the village life of Bengal, that a pair of Khaddar spun and woven at home by the peasant or his spouse in their leisure-hours out of the cotton that he grows around his humble dwelling, means a morsel of rice more for his child and a bolder face to meet his creditor with. These necessaries that one would have to buy at a town-market, he can find at home, cost free, if only he would train himself to the habit of usefully employing his off-minutes. These off-minutes by themselves have no economic value; no mill-owner or factory magnate would pay for them, but at the end of the year, the tiller of the soil finds, to his happiness, that he is no longer naked. I am told people living in towns have already to live at such a high pressure that they have no spare moments to speak of. I do believe there are a few whose business of life is so exacting that it does not leave any convenient period for spinning; but without any great error, I can make the observation that with most of us in towns, this argument does not held good. The chronic want of the middle-class gentlemen whether in villages or towns, is often to be traced to the shortage of clothing and other outfits. If such men did take to Khaddar even as a matter of necessity, I am sure much of their domestic miseries would come to an end, and chill penury that wrecks most homes, would disappear. The question of townspeople does not arise to any great extent as 95 per cent of the people of the country live in village. The latter must work out their salvation in spite of their richer brothers in cities, and in the great sweep of nations and nationalities endeavouring to come abreast of the times, the greater truth still remains.

A bold peasantry, a country's pride,
When once destroyed can never be supplied.

It is necessary, therefore, to understand clearly our nation-building programme; and indeed on our definitely appreciating the ideal we desire to attain, will depend the trend of our activities. The significance of this, if properly realised, will help to clarify confused political issues, and the present wrangling over Council-entry or non-entry, will appear altogether profitless. I am not a student of politics, but such politics as has been thrust upon me, has given me the impression that Bismarck spoke the plainest truth when he made his celebrated utterance that politics is the science of opportunism. The result of carrying on politics on principles of opportunism has given cause for thinking. If a diplomat were to lay bare his thoughts on these points, he would have to say first that in politics they do not recognise boundaries, which amounts to saying that political ethics is different from ethical ethics. The Non-Co-operation movement, if it means nothing but political expendiency without the moral significance which, I hold, it implies, is no better than the science of opportunism, and as such loses all its distinctiveness and ceases to be the fitting meassage of the greatest soul alive at the present moment. With Khaddar as I understant it—and that is what I stant for—the idea of political expediency is not associated. But so firmly do I believe in it as a source of strength, moral fitness and economic salvation for—the masses, that if autonomy did come I am afraid we could not receive it and work it to our credit, without such a clear proof of our national fitness.

Khaddar stands for the habit of industry, for a deeper and significant types of national organisaton and in fact for a democracy without the venom of envy. Even if Non-operation were ever interpreted differently, the Khaddar movement should stand on its own moral and economic ground. This economics as I have already mentioned, is somewhat different from the economics of the share-market or the bourse. I do not care whether Bombay suffers or Japan or Manchester wins,but as a man, I have the right to spin and weave, and that is to my well-being. The Prophet's dowry to his daughter was a spinning wheel and a grinding stone; and she that spins the longest yarn, said Mahomet, is the most virtuous woman.

Some have observed that Khaddar stands for retrogression of culture and art, if to try and be indepedent of others is want of culture, I for one, a thousand times welcome it. As to art let me just point out that the Dacca muslin was not a mill product. I have seen real work of art coming out of the Charka, the like of which would be a wonder to the most finished machinery, and let me add that the most well-intentioned industrialist will only end by taking away bread from a couple of hundred men for every machinery that he installs. Mills have limits and limitations as all human institutions have, but over milling ends by trying to find a dumping market for unconscionable profiteering. It is in this way the international question of policy and polity is opened up and with it the endless complexities and superfluities of modern life. Where a proper appreciation of the limit of machine and manual labour fails, there come up the prosperity of the few and the wretched degeneration of the many. This inequality stands out so boldly and almost shamelessly today that even those who some years ago had reached their utmost mental and moral degeneration in believing that they deserved no better treatment than was accorded to them; have begun to realise their unmerited lot and have made a stand against capitalism. As long as capital was symphathetic, humane and personal, in its relation with those it employed, the conflict of today did not exist; but large syndicates and trusts have made such personal relationship impossible, and in fact, there is so much of organisation that the human element is practically absent in them. This points to the salubrious influence that cottage industries alone can exert in upholding the labouring classes. There the gentleman-employer makes his living along with his employee, and his clubs and recreations are often not without his men. The underlying current of democracy in such village organisations, is sweetened by the useful patronage of the master, and even to-day the new cult has made it possible for a master and his chaffeur to weave out of the same loom. This is an instance I know of. The far-reaching effect to this Plebeian movement is to rehabilitate the brotherhood we lost in the vortex of a fundamentally wrong conception of civilisation. Times without number have I tried to differentiate between true culture and civilisation with its puffs and perfumes and never have I felt the need of appreciating this difference greater than to-day. In the absence of a proper perspective of life and living, Science has been abused by the state and the capitalist. This abuse has given rise to what passes by the name of civilisation, leading to a destruction of real culture. While I make this statement, I do not for a moment believe in idle philosophy;

there must be a continued struggle in the individual or nation to reach its ideal, but with the absence of nervousness and artificial stimulus that so characterise the West to-day. Such a state of activity cannot be for the good of man. The work or struggle that is going on in the circulatory system, is hardly even felt by us, but sure as anything so long as we are alive, it goes on for our benefit.

In all our efforts, therefore, we should try and discern what is good for us as a whole and what is good for us in part. Artificial stimulus leads, ultimately to overstrung nerves, and will end like Dr. Jenkin's pearls. Such is the effect of the civilisation which is still manifestly spreading over the world; but the time for crying halt has arrived.

If we review the condition of labour and recreation in village, we cannot help feeling that for 3 or 4 or at the most 5 months, the cultivator has his fullest occupation; for the rest of the year, he is appallingly idle, and that is just the time for spinning, weaving, or other collateral occupations. The effect of this is so wholesome on the individual (as also on the nation) that it immediately raises him above poverty, and affords him the opportunity of acquiring culture through education which is a duty we own, no less than the continuity of species, to the ever-evolving mother, Nature. Our occupations of life are inter-dependent: Khaddar, whilst clothing us, gives occupation to the village blacksmith, the carpenter, the dyer, the spinner, the carder, and many others in its train. The pernicious middle man in such a village organisation disappears, and even if we have to pay more for a pair of Khaddar, the money remains in the country and contributes to the well-being of the natoin as a whole, and establishes a fundamentally sound economic condition in villages.

Khaddar is so intimately connected with agriculture, that I cannot conclude before I have at least, touched upon the very important point, the feeding capacity of our lands. It has sometimes been pointed out that by returning to agriculture we shall soon realise that it requires to be relieved, as there is not enough bread for all of us in the land. But statistics tell a different story altogether. In Bengal alone there are 10 crores and 60 lakhs bighas of arable land, of which 6 crores and

25 lakhs bighas are under cultivation. Yet we have not enough to eat and famines are almost annually our guests! Science which in the hands of the state and the capitalist has of late been employed for the most inhuman of purposes, would fulfil its function better by discovering means of increasing the out-turn of the land, and we in the tropics at any rate, could look forward to the unbounded current energy of the Sun to help us in the struggle of life. Some 36 year ago while I was a student at Edinburgh, it was the ceaseless refrain of the speeches of Mr. Joseph Chamberlain, the representative of sooty Birmingham, one of the most industrially advanced towns in England, that the time had come when we must cry halt and revert to the idyllic life of old England with "3 acres and a cow" for every tiller of the soil. The late war has also taught England to realise the truth of Chamberlian's view and the cry "back to the land" is universal. Like the great Ciam cian, I could say with a pardonable degree of national pride, that when the coal fields of the frigid West would be no more, its mills, and machineries would stop with all its tinsel of civilisation, and to relight the torch, it will have to again apply to the East, the land of sunshine.

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Message of Khaddar
Address*

On the Opening Ceremony of Khadi Exhibition Coconada

FRIENDS,

When I received your kind invitation to take upon myself the great honour of opening this All-India Khadar Exhibition in the heart of the Andhra country, I confess, I felt that it gave me an oportunity to speak to the representatives of the provinces gathered here, what I feel about Charka and Khadi, an opportunity which I cordially appreciate.

At the very start I must express my annoyance at one thing, and I am this time going to speak out, it is in the lip-homage that it has now become the fashion to pay to Khaddar; in the neglect and apathy that is again growing on apace about Charka in particular, and silent, serious, solid constructive work in general; in the drowning of the musical hum of the spinning wheel in the more uproarious din of the market-place and polling-booth. Annoyance is not the proper word—deep anguish creep on my soul when I find that our former, age-long inertia and listlessness are invading us again; and that the splendid inspiration and lead that was given to the nation by our august leader, Mahatma Gandhi, is ebbing fast away and getting lot in the morass of sporadic outbursts and fussy sensations. Let me make myself clear; I have no quarrel, not in the least, with sensationists and political dramatists. Sensation and drama have their place and no mean place in the moulding of public opinion and in the vitalisation of popular enthusiasms—but it becomes a disaster if these are allowed to engross our whole attention and tax all our energies—if there is not the solid back-ground of real, unotrusive work done by and for the rank and file of the people, then all these dramas ultimately degenerate into farce, to the infinite chargin of the patriot and the merriment of the enemy. These remarks are being wrung out of me by the sight that the country now presents—the paralysis of well-nigh all our constructive work—the endless wrangling about the pros and cons of Council-entry that has been our favourite occupation for the last year and a half, as if that were the only thing that mattered—and Charka and Khaddar and National Schools and untouchability and arbitration and village organisation, all relegated to the scrap-heap, or at most, verbally mentioned in mock reverence and then brushed quietly aside. What a fall from 1921? Was it for this hair-splitting disquisition on the wornderful efficacy or otherwise of the Council-chamber as an infallible patent for obstructive Non Co-operation, that students flocked out of the schools and colleges in their tens of thousands, that young and old, men and women, vied with one another in marching to the jail as if it were a place of pilgrimage, that the demos of the country surged and pusated and swayed as it has never before done in our recorded history? The nation in its hunger for freedom cried for something more substantial, more life-giving than these arid discussions—and fortunate was India that at this crisis of her history she was blessed with a Captain who was not pestered with catch-words, but who laid down unflinchingly the steep, narrow path that alone can lead to salvation. The Captain is not with us today; but shall we falter ? The path of salvation, say the Upanishadas, is not easy,—sharp as the razor's edge, difficult of access, difficult of progress, this is what the wise men say. But mark you my friends—this and none other is the way.

Perhaps in the fullness of my heart I have spoken more passionately than I ought to have done— but I confess that the state of things in Bengal, so far as constructive work is concerned, is such that it has filled my heart with infinite sadness—perhaps, and I fervently hope it may be so, the state of things is more hopeful, more promising, more encouraging in other provinces, in your own Andhra for example — and perhaps the seed, the little seed that our Master-Gardener planted with so much care and solicitude and sacrifice will yet sprout forth and develop and expand into a giant tree of spanless birth.

Of the various items of constructive work that lie before the nation, and on which so much emphasis was laid by Mahatma Gandhi, the most important and the most urgent for the economic prosperity of the people is the universal adoption of the Charka. What method is there which is available to every body, even the poorest and the weakest, and which may enable every one, man and woman alike, to add substantially to his daily income? Such a method can only consist in removing the indispensable wants which everybody feels and which can be accomplished by means within everybody's reach. And what other method is there which supplies all these consideration excepting the homely Charka, which even the frailest women can use end even the poorest can procure or manufacture and repair for themselves, and which would double the average daily income of the Indian proletariat, or if you prefer reckoning in kind, would do away with the peasants' cloth-bill altogether and also leave some margin behind? There is absolutely none other in the nature of things there can be none other, excepting agriculture, and agriculture does not exhaust all the energies and the time of the peasant. At the most generous calculation, it occupies him for not more than eight months, in some parts of the country considerably less, and the remainder of the year is practically spent in idleness and wasted. So much for the menfolk; as for the women-folk practically throughout the year they can devote some little time to spinning, which would more than suffice to clothe the whole family for the year. Even from the argumentation point of view, this sounds convincing enough; but here I can say from personal experience during the organisation of relief-works in connection with the Khulna famine and the North Bengal floods that this is not mere theory but the barest practiccal truth. Had the ryot an alternative and supplementary means of livelihood to fall back upon, he would not have been at his wit's end for the failure of a single season's crop. And when we have tried to introduce spinning by the supply looked upon it as a God send after observing the actual results.

That I have not exaggerated a bit will be evident from a few very simple figures. What is the average annual income of an Indian? Naoroji, Digby and Ramesh Dutt have discussed the question theeadbare; and Lord Curzon after having joined issue with them, came to the comfortable conclusion that the Indian, prosperous under British rule, can boast of the magnificient income of Rs. 30/- per head annually. Lord Curzon's reputation for veracity is well-known; let us therefore not dtaqpkitdoubt the correctness of this estimate. Even with this Viceregal estimate, however, the daily income works out at about an anna and a quarter, or five pice per day. Let us now see what addition to this income can be made by the adoption of the spinning-wheel. If a Charka is worked eight hours a day, then a practised spinner can earn 2 annas. If, to be more cautious in our estimate, we reduce the number of hours as well as the rate of production, even then there is not the shadow of doubt that the daily income is doubled,

I need not dilate upon this point, the figures speak for themselves. Another point should also be remembered. Spinning does not stand by itself; if it is universally adopted as a home-industry, it lends a fillip to and keeps moving a host, of other simple village industries. When an entire village take a to Charka, the wearing-loom also becomes brisk; side by side, the dyer, the carpenter also find occupation. In fact, spinning may be regarded as the key industry of village life, the only home-industry par excellence, and it goes far towards making the villages self-contained in the matter of our indis pensable requirements. The spirit of enterprise, and briskness and self-reliance that such an organisation connotes would soon bring new life into our villages, and would prevent them from falling into the decay that is at present gradually overtaking them.

If we translate these figures from the individual to the national scale, then the effect seems staggering. Taking the population of India to be roughly thirty two crores, the total income, according to Lord Curzon's computation, would amount to nine hundred sixty crores of rupees per year. Now if only one fourth of the population would spin 2 hours daily, then the national annual will be increased by ninety crores. This is on account of spinning, of spinning alone, without taking into consideratiin the increase due to weaving this yarn and also the additional income accruing to other professions, the carpenters and smiths, for supplying the accessories. And as a mere element in this stupendous whole, the annual drain abroad of sixty to seventy crores of rupees on the score of piece—goods would stop and would remain in our county to enrich and nourish the life-blood of our half-starved peasantry.

Some people may ridicule these figures and say that their staggering magnitudes themselves prove their absurdity. One can only pity them. The narrow grooves along which their ideas travel make it very difficult for them to visualise the gigantic effects of an industry that is universally adopted, —even the much—inflated and over-capitalised joint-stock companies, trusts, and combines can be nowhere near approching them. This universal - adoption is what such an industry potent.

The question of distribution is of very great importance. If it has been simply a question of stopping the drain of money outwards and keeping the money somewhere in the country, then the purpose would have been equally served by big capitalistic concerns, by the creation of a number of giant electric "power mills, and so on. But for the purpose of distribution, mills and big manufacturing concerns are wholly incompetent. Mills can only reap profits, they cannot distribute them. And the problem of distribution is not a with less urgent than the problem of production. What do we gain if the millions of our countrymen starve while the few fortunate mill-owners fatten on their unnatural gains? Only inequality in wealth will be created; the spectre of hunger and unemployment will stare us in the face in an uglier form? and a class-war, of dimensions the most appalling, will inevitably ensue, adding another most complex element to our already sufficiently complex problem. I need not be understood as saying by this that all big-scale industries are to be smashed—the thing cannot be disposed of so airilly— and I could not even if I would. But surely you will agree with me that if the same result can be brought about by means much the less harmful, surely that were preferable. This work of distribution is, as I said, done almost automatically by the adoption of the Charka. As Mahatma Gandhi once very beautifully put "No amount of human ingenuity can manage to distribute water over the whole land as a shower of rain can. No irrigation department, no rules of precedence, no inspection, and no water-cess Everything is done with an ease and gentleness that by their very perfection evade notice. The spinning wheel, too, has got the same power of distributing work and wealth in millions of houses in the simplest way imaginable".

An easy, healthy and natural process of increasing the wealth of the country, and a smooth and automatic way of universalising the incidence of that wealth—that is what the Charka represents. And it is not, to tell the truth, a new and untried system invented by quacks for the cure of our economic distemper. The spinning-wheel is not an innovation in India; it is, on the countrary, perhaps the longest-standing industry, next to agriculture in India's history. Not even a century ago, the spinning-wheel was the rule, and not the exception, in every village household. It would be sufficient to give a few extracts from the statistical observations of Dr. Francis Buchanan'a economic enquiries in Southern and Northern India conducted between 1798 and 1814. They will go to show how wide-spread this industry was throughout the country, and how many hundreds and thousands of our men, women and children worked at it —mostly in their leisure hours—each day and earnedrores of rupees annually.

"In the districts of Patna and Behar with a population of 33,64,420 souls, the number of spinners was 3,50,426. By far the greater part of them spun only a few hours in the afternoon, and upon the average estimate the whole value of .the thread that each spun in a year was worth Rs. 7-2-0 giving a total annual income of Rs. 23,67,277, and by a similar calculation, the raw material at the retail price will amount to Rs, 12,86,272, having a profit of Rs. 10,81,005 for the spinners, or Rs. 3-4-0 per spinner.

"In the district of Shahabad, spinning was the chief industry. 1,59500 women were employed in spinning and spun yarn to the value of Rs. 22,50,000 a year. Deducting the value of cotton each women had something left to her to add to the income of the family to which she belonged. (Nowadays these 22 lacs would at least represent five times the amount ie. over one crore of rupees.)

"In the Bhagalpur district (with a population of 20,19,900) where all castes were permitted to spin, 1,60,000 women spent a part of their time in spinning and each made an annual income of Rs. $4^1/_2$ after deducting the cost of cotton. This was added to the family income.

"In the Gorakhpur district (population 1,383,495) 175,600 women found employment in spinning and made an annual income of Rs. $2^1/_2$ per head.

"In the Dinajpore district (with a population of 300,000) cotton-spinning, which was the principal manufacture, occupied the leisure-house of all women of higher rank and of the greater part of the farmer's wives. Even the women of the Brahmans here employ themselves in this useful industry. Three rupees was the annual income each woman made by spinning in her afternoon hours.

"In Eastern Mysore women of all castes except Brahmans bought cotton and wool at weekly markets, spun at home, and sold the thread to weavers. Men and women thus found a profitable occupation. In Coimbatore, the wives of all the low-class cultivators were great spinners,

"The statistics of weavers show that they also were as numerous as the spinners. In the Patna city and Behar districts the total number of looms employed in the manufacture of chaddars and table-cloth was 750, and the value of the annual mamtfature was Rs. 540,000, leaving a profit of Rs. 81,400, deducting the value of thread. This gave a profit of Rs. 108 for each loom worked by three persons or an income of Rs. 36 a year for each person. But the greater part of the cloth-weavers made coarse cloth for country use to the value of Rs. 24,38,621 after dexacting the cost of thread. This gave a profit of Rs. 29 for each loom.

"In Shahabad, weavers worked in cotton only. 7,025 houses of weavers worked in cotton and had 7,950 looms. Each loom made an annual income of Rs. $20^3/_4$ a year and each loom required the labour of a man and his wife as well as one boy or girl. But as a family can not be supported for less than Rs, 48 a year, it is suspected that the income of each loom given above is understated.

"In the Bhagalpore district, some worked in silk alone, a great many near the town made Tasar fabrics of silk and cotton intermixed; 3,275 looms were so employed that the annual profit of each weaver employed in the mixed silk and cotton industry was calcutated to be Rs. 46 besides what the women made.

"For the weaving of cotton cloth, there were 7,279 looms. Each loom yiedled a profit of Rs. 52 a year.

"In the Gorakhpore district there were 5,434 families of weavers possessing 6,174 looms, and the average income brought by each loom was Rs. 38 a year.

"In the Dungarpur district "Maldai" cloth was manufatured. It consisted of silk and cotton 4000 looms were employed in this work, and it was said that each loom made Rs. 20 worth of cloth in a month. About 800 looms were employed in making larger pieces in the form of Elahis.

"In Eastern Mysore cotton weavers made cloth for home use as silk weavers produced a strong rich fabric. Workmen who made cloth with silk borders earned 6 annas a day and those who made silk cloth earned 4 annas".

These figures are eloquent. Crores of rupees were earned by these spinners and, weavers by following this calling. And this universal adoption was the reason why India not only clothed herself but helped nations beyond the seas. And as Mahatma Gandhi very pert inently remarked :- "The decentralisation of the industry—every village, town and district having always at its command as much supply as it needed—automatically facilitated its distribution and saved the consumer from Railway, Excise, and all sorts of tariffs and middlemen's profits of which he is a victim to-day. If we cannot return to these days, though there is no reason except our own bias and doubt why we should not, can we not at least so organise our industries as to do away without much delay with the foreign cloth with which our markets are being-dumped to-day?"

The whole position has been very beautifully put in a nutshell by

Mahatmaji. "Some consider that I am putting back the hands of the clock of progress by attempting to replace mill-made cloth and mill-spun yarn. Now I am making no such attempt at all. I have no quarrel with the mills. My views are invariably simple. India requires nearly 13 yeards of cloth per head per year. She producess, I believe, less than half the amount, India grows all the cotton she needs. She exports several million bales of cotton to Japan and lancashire and receives much of it back in manufactured calico, although she is capable of producing all the cloth and all the yarn necessnry for supplying her wants by hand-weaving and hand. India needs to supplement her main occupation, agriculture, with some other employment. Hand-spining is the only such employment for millions. It was the national employment a century ago. It is not true to say thet economic pressure and modern machinery destroyed hand-spinning and hand-weaving. The great industry was destroyed, or almost destroyed by extraordinary and immoral means adopted by the East India Company. This national industry is capable of being revived by exertion and a change in the national taste, without damaging the mill-industry. If this employment were revived, it would prevent crores of rupees from being annually drained from the country and distribute the amount among lakhs of poor women in their own cottages."

The beauty and simplicity of this programme, thus outlined in clear, laconic language, by Mahatma Gandhi leaves nothing to be desired. Yet objections have been urged against its adoption—objections theoretical and practical, historical and economic, and what not? It has been emphasised that the Charka is a rank, economic heresy in these days of steam driven; electricity-driven, petrol-driven, machineries; that it would be nothing short of a disaster to civilisation if modern up-to-date time-saving methods were again to give place to these crude, primitive methods; that the adoption of such inefficient methods would be sheer waste of time which might have been much better utlised in other ways; that it is practically impossible even had it been desirable, for the Charka to live in competition with mill; that not merely in India but in every other part of the world, the spindle and the hand-loom were in vogue before the Industrial Revolution, but that everywhere they had died a natural death as instruments of mass-production, and if we might Judge from history, the result could not be otherwise in India; that the Ganges cannot be forced back to Gangotri; and similarly in these days of rapid communication and easy transport, in these days of telegraphs and telepones, of giant ocean-liners and railway-trains, airships and motorcars, the vision of snug, little self-contained villages ensconced in their quiet meadows, living by themselves and for themselves is a Utopian vision—gone for ever and never to return.

The objections are formidable enough; they do not frighten me, however, for I do not dispute the truth and force of most of these statements; only I feel that this solid battery of arguments .is somewhat misplaced—for I do not dream of emulating the achievements of Don Quixote of famous memory. I am not nut to tilt at wind-mills, I have not taken a vow of ridding the fair bosom of mother India of the unsightly spectacle of whirrling dynamos and smoking chimneys—my plans are not half as ambitious. I deed. my antecedents, I venture to think, are guarantee enough that I am not likely to suffer from a particularly virulent type of anti-machinery obsession, or anti-Western bias. I have visited Europe four times and have lived altogether eight years in England. And in a manner it has been my privilege to be instrumental in introducing in Bengal at least one aspect of Western civilisation. Close upon a century ago, the great German Chemist Liebig laid down that the index of civilisation of a country is the amount of soap it consumed and he further asserted that the industrial progress of a country was measured by the output of its Sulphuric Acid. And it so happens that I am intimately connected a with several concerns—one of which manufactures soaps in large quantities and which I trust invites competition with imported stuffs— and another, the Bengal Chemical and Pharmaceutical Works, Ltd., bids fair to be the biggest producer in India of Sulphuric Acid and its accessory products. With these certificates and testimonials duly laid before you, I think you will concede that when I plead for the Charka and the hand-loom as the means of the economic salvation for our unhappy motherland, I do so with my eyes wide open and with full consciousness of what modem machinery can achieve.

I am in this respect in a much more fortunate position than Mahatmaji, whose life was rendered almost miserable by his critics for his alleged vendetta against western civilization. But in this matter even he spoke out in no uncertain voice that whatever his individual notion of ideal social economy might be, he had declared no jehad against mills. He said:

"Do I want to put back the hand of the clock of progress? Do I want to replace the mills by hand-spinning and hand-weaving? Do I want to replace the railway by the country-cart? Do I want to destroy machinery altogether? These questions have been asked by some journalists and public men. My answer is: I would not weep over the disappearance of machinery or consider it a calamity. But I have no design upon machinery as such. What I want to do at the present moment is to supplement the production of yarn and cloth through our mills, save the millions we send out of India, and distribute them in our cottages. This I cannot do unless and until the nation is prepared to devote its leisure -hours to hand-spinning."

Really this question of competition, this economic bogey that is paraded by theorists, we do not contemplate. If it comes to the commercialisation of Khaddar, of selling in the market like any other commodity and buying by strange customers, then I confess that there is very little chance of competing in point of price with piece-goods turned out in large quantities by up-to-date machinery with its labour saving devices. What then do we mean? We mean this that spinning be taken up as an essentially domestic programme, worked in every household, out of cotton grown in the cottage compound the thread woven into cloth either by the family or by the neighbouring village-weaver on the payment of a nominal remuneration, and intended for the use of the family members themselves. Just as klchen-work is undertaken in every household by the members of the family and eatables are not indented or purchased by cash-payment from any huge hotel or restaurant, in exactly similar a fashion should the clothing be provided for. The question of sale and purchase, of price and competition, would simply not arise. At the present moment, when cotton cultivation has not yet been universally resorted to, the cotton of course will have to be purchased. But even this should not be allowed to continue; the act aim should be to plant cotton in every householder's grounds, and out of the product of those plants the family's clothing should be manufactured. This should be the method of work: prepare cloth at least ordinary everyday cloth, as you do your food, as a household requirement; abolish it as a marketable commodity, a subject of sale and barter. The competition bogey would then vanish into thin air.

Of course, if surplus yarn is turned out, and if cloth is woven out of that, naturally that will go to the market and people who want cloth will buy it. There will not be any dearth of buyers because there always will be people who have not got the time or the leisure to prepare their cloth for themselves—they may be engaged in more profitable occupations, in more arduous professions— they have no other alternative but to buy cloth. This mention of people who have no leisure to spin and who find it much more profitable to utilise their energies in other ways, reminds me of a very cheap ridicule that is sometimes flung at the exponents of Khaddar— viz that we want everybody to give up all other work, and to devote his time to spinning alone. Even "The Nation" the famous London weekly, which is remarkable for its bread-the of outlook. once wrote:

"To go back to the spinning wheel is a retrogression. The attempt is pitiful and even ludicrous, when young men who should be studying at the University are invited to do with their hands and feet, the works of dull toil, what a machine would do as well in one hour."

Of course the remark is quite justified if one seriously calls upon all young men to do so. But that is not what actually happened. When new movement is initiated, the intelligentsia must take it up before it can filter down to the masses. The educated classes must set the fashion; and the masses will not look upon the work as degrading and menial, and that is why in the beginning of the movement, everybody, student and professional men alike, were asked to devote some part of their time to spinning. When we come to the question:- of a practical progranme, however, it is easily understood that this mesage of Charka is essentially a message or our peasants and workers, the teeming millions of India, who have got their leisure time to devote to this work. And as I have pointed out already, this labour, which brings a profit that means a mere pittance to the favoured few, spells to them the difference between semi-starvation and a full meal. It is the salvation of the Indian proletariat.

John Stuart Mill, the great apostle of Political economy, is of opinion that to bring about a change in the existing deplorable state of affairs, a turnover in the mentality of both the labouring classes and their employers is necessary, that both these classes must combine for general, at all events, for public and social purposes and not, as hitherto, solely for narrowly interested ones. But the capacity to do this had always existed in mankind, and is not, nor is ever likely to be, extinct. "Education, habit and the cultivation of the sentiment will make a common man dig or weave for his country as readily as fight for his country."

However that is in passing. When the ideal that I have envisaged comes to pass, when the spinning wheel is humming in every house, when it is catering for the cloth in every family, the complaint of high prices will no longer be heard— in fact the question of prices will not crop up at all. There need not then be the fear of competition with cheaply turned out foreign piece-goods. And so long as that happy state of things is not reached. I think it is not asking too much of our patriotic countrymen to sacrifice something in the shape of higher prices for the support of home-made goods. Ours is not a National Government, ever on the alert for the protection of nascent industries; we must substitute for state-imposed protective tariff, our own preference for our indigenous products. As we all vowed in 1905, we must buy Swadeshi goods even at a sacrifice. Of course this state of comparatively high prices must not be regarded as the normal state of things—people must not be expected to resort to sacrifice as a normal and permanent course of action—we must take steps to turn out piece-goods in quantities so ample as to bring down the price automatically—otherwise mere cries of boycott and sporadic injections of political enthusiasms will all end in smoke, and perhaps give rise to irritation and disgust. Supply must be increased—there is no shirking that question. Those of us who think that the deficiency can be made up by the starting of a number of high-power mills are quite welcome to do so—I have not the least quarrel with them. Only as I have pointed out before they solve only one part of the problem —viz that of production; they leave the question of distribution exactly where it was. Still, let those who believe in mills start them. But such big establishments require mints of money and cannot be called into existence for the mere asking—they require time to organise. While therefore capitalists are thinking about the setting up of big mills, the country cannot wait—we must set about putting our houses in order, we must see that the cloth-problem is solved at the earliest possible moment and no other method can do that except the introduction of home-spinning. Apart from all the other considerations that have been set forth above in favour of the adoption of the Charka, from this very commonsense and practical point of view also, the urgency of the step is clear.

I think, my friends, you will now agree with me that, after all, the good old Charka is not such a rank economic heresay as we might be tempted to think at the first galnce. In cannot be dismissed with a contemptous sneer as a crude mediaevel anachronism. It is perhaps-high time that economists gave up their high-brow attitude. Doctrinaire economics of the Manchester brand does not perhaps sweep round the universe with the same flush of uninterrupted success as it used to do before. And its most able exponents have been obliged to confess that it is after all not an exact science, but is very much a social science-affected and modified by the variations in the conditions of social economy in various parts of the world. The cult of efficiency and labour-saving which came to be regarded as sacrosanct in the first glamour of the industrial revolution has now come to "be regarded with a bit of suspicion: Machinery which nearly threatened to supplant man, the twentieth century has succeeded in taking down from its false pedestal, at least in theory, and relegating to its proper place as the servant and not the master of man. The tedium, the dullness, the drab uniformity, the soulless grinding, the thougtless centralisation that machinery leads to, has now been recognised — the cry has now been openly raised —"Back to the man, Back to the villages: The purposeful activity, the healthy variety, the fine individuality of the village worker, working in the bosom of his family amidst his quiet surroundings has now extoreted its due. meed of praise even from the most dry-as-dust economist. Even in industrial England so early as forty years ago, Mr. Joseph Chemberlain representating sooty Birminggam along with his henchman Jesse Collins stood up for "3 acres and a cow",; and while I am writing these lines, my attention has been drawn to Premier Baldwin's piteous pleas for the preservation of small cottage industries. Listen to what he says :

"Government proposes not only to keep men in rural districts, but to do something to prevent destruction of small but ancient industries throughout the countryside, the industries, of the Blacksmith, the Wheel —wright, the Saddler and others."

If that is the outlook even in England advocated by the greatest thinkers and statesmen there, how infinitely more necessary is it in India where the traditions are entirely for the cottage industries? In our blind veneration for dogmas about economic progress, not overmuch applicable to our social economy, we cannot afford to risk our all.

This disintegration, this disaster that is taking place before our very eyes, did not escape the observation of that very shrewd observer, Mr. Ramsay Macdonald, who says in his "Awakening of India":

"These changes in Indian economy, it is said, have to come because they are incidents in the path of progress. That is the only obiter dictum of our western blindness and arrognace. We live under the delusion that there is no emancipation except through the disintegration of social organisation. In the old days there was an organisation which made the interdependence of the various functions in social life real. Exchange was in the first place internal to community. There was a common wealth. The despised money-lender was a necessary social functionary. Now that is broken up, the individual cultivator has been dragged into wide relationships. He gets price for his products and he pays his obligations in coin. The economic community is broken up. Exchange of service has given place to purchase of service. Produce is taken away and the price of it remains, and this price is subject to many fluctuations in value to which the producer under the vanishing economic conditions was not subject. The money-lender from being a social functionary has become a parasite. Individual capitalism is proving itself to be even more destructive of the best that is in India where its operations are alien to the civilisation of the country than it has proved to be in the west, where it has not been so alien. The ways of western progress are not the ways of eastern progress. It is simply absurd for us to look complacently and see the ancient methods of credit upset, the ancient protections from famine swept away, and the ancient balance and economy destroyed, and rejoice that through this ruin, progress comes".

No truer words of warning were ever uttered. India cannot afford to ignore it if she is to live. The reign of the machine has not been much of an undiluted success even in the West where it has grown naturally, is it likely to be a success in India where it is only being transplanted as an exotic? Look at America, the paradise of modern Croesuses. Only the other day, I was reading an account of the congested slums of New York—the city of sky-scrapers—where the children of the working classess are on an average 15 lbs. underwright for being brought up in rank Mephistophelean atomosphere. With painful and fatal precision, homeless, propertyless, shiftless, debased and demoralised proletariat dogs the footsteps of an unbridled industrialsim. And at the other extremity, a hide-bound plutocracy revels in heartless enjoyment of its demoniac power, and everybody, prince and peasant alike, to carry out its mandate and further its ends.

And as a result of this terrific clash, Marxism, leninism, Bolshevism rear their portentous heads, threatning to engulf all civilisation in a stupendous cataclysm.

Dark is our outlook, if this thing goes on unchecked—if the prophetic warning of seers and thinkers to betake to a healthier course of action is unheeded. This ceaseless, restless din and bustle, this unsightly, ungainly defacement of humanity, this ugly, hideous defilement of nature must cease if the world is to regain its health and normality. Grace and beauty it has none—none of the sparkle of life's efflorescence—it is all dull and drab and sordid. If you look at it aesthetically, the thing is execrable.

This aspect of modern civilisation has also been very vividly described by Dr. R. Austin Freeman contrasting the gracelessness of modern civilisation with the healthy charm of hand labour, he mentions the very item of our present discourse—home spun cloth—and he proceeds :

"If we chose to clothe ourselves in homespun which would last half a lifetime instead of in cheap machine-made garments which wear out in two or three years, one old industry might be revived. There is think of the conditions under which everything that we buy is produced. We should then take much more pleasure in a hand-made article, with some individuality in it, than in a standardised product of a great factory, which speaks of nothing but soulless, irksome labour. We are now suffering from standardised minds as well as from standardised commodities and they suit each other."

"We have during the period of a quarter of a century compelled the Indian terriotries to receive our manufactures, our woollens, duty free, our cottons at $2^{1}/_{2}\%$ and other articles in proportion, while we have continued during that period to levy almost prohibitory duties or duties varying from 10 to 20 30, 50, 100, 500 and 1000% upon articles, the produce from our territories. Therefore the cry that has taken place for free trade in India has been a free trade from this country, not a free trade between India and this country, ... The decay and destruction of Surat, of Dacca, of Murshidabad and other places, where native manufactures have been carried on, is too painful a fact to dwell upon. I do not consider that it has "been in the fair course of trade. I think it has been the power of the stronger exercised over the weaker".

In course of the recital of instances of barbarous oppression practised on Indian weavers and artisans Boltz writes: 'and the winders of raw silk called Nagaads have been treated with such injustice, that instances have been known of cutting off their thumbs, to prevent being forced to wind silk". No wonder, the Historian Wilson would exclaim: "The foreign manufacturer employed arms of political injustice to keep down and ultimately strangle a competitor with whom he could not have contended on equal terms". This quotation is from Wilson who wrote in 1813.

The quotation is from old History but the policy of making England thrive at the expense of Indian industries still continues unabated. Dutt writes as late as 1901 that "the bread of Indian artisan and manuprotect, foster and revive their old and ruined industries, lancashire would not permit any such endeavour, if it was made."

I would now ask the educated men of India to consider if they would still stoop to be clothed at the hands of the same lancashire in whose interest our country has been so far degraded and rendered destitute? Would not the fine pieces of foreign cotton goods hang heavily on our body? I utter not these in hatred to Lancashire but out of love to the millions who would get a morsel of food if you, educated men, would cease to be clothed by foreigners, for your example will filter down and help to usher in a new era in our industrial, economic and also assuredly in political life.

I am afraid, my friends. I have tired out your patience by this long and somewhat discursive homily— I beg to be excused—it is so difficult to stop when anything touches the heart so nearly, and so that I am arguing to the convinced— and convinced by one far greater than myself, not merely by words but by the force of his living example. That frail figure, loin-clothed in Khaddar, eloquent in its very silence, roused India as by electric thrill. from one end to the other, and moved her to spare no pains in realising the ideal her great leader had placed before her. I can only add my feeble voice to that soul-stirring appeal which ought not to stand in need of any such addition.

The learned Doctor has hit the right nail on the head—our disease is that of standardised minds. Unless and until we can shake. this off—shake off this habit of thinking to order—and begin to look about for ourselves and get into touch with the real heart of things, we cannot hope to attain salvation, economic, political or otherwise. Mental paralysis must go-we have heard a great deal about slave mentality—this is slave mentality, and this must be abjured.

We are apt to hear in season and out of season that India is an agricultural country. But it is not true; she was an industrial as well as an agricultural country. Mr. Montgomery Martin in his evidence as an agricultural; and he who would seek to reduce her to the position of an agricultural country seeks to lower her in the scale of civilisation. I do not believe that India is to become the agricultural farm of England; she is a manufacturing country, her manufactures of various descriptions have existed for ages and have never been able to be competed with by any nation, wherever fair play has been given to them. I speak not now of her Dacca Muslins and her Kashmere Shawls, but of various articles which she has manufactured in a manner superior to any part of the world. To reduce her now to an agricultural country would be an injustice to India".

But she was reduced helplessly to the condition of having to depend entirely on agriculture. How it was brought about is a matter of common knowledge. The literature of the Victorian period of British Rule teem with facts and each one of the indictments is serious enough to make one shudder with horror at the barbarity practised to throttle a nation's source of wealth and production. In the days of the Mussalmans, India prospered. Just on the entry of the East India Company in In dia and about the time of the dismemberment of the Empire of the great Mughuls, India was full of wealth and life. Boltz in his "Considerations on Indian Affairs" writes "Delhi without the aid of silver or gold mines, was in her times of prosperity a receptacle into which the gold and silver of the greatest part of the world had been flowing by regular channels for ages, till foreign invadors interrupted its courses. This great influx of wealth was owing first to the extraordinary fruitfulness of the dependent dominions, secondly to the sober industry of the inhabitants, either applied to agriculture which was greatly encouraged or to manufacturing those commodities which have for many ages been in esteem throughout the world; and thirdly to the strong protection granted to the merchants."

Instead of giving protection to the Indian Industries, England used her utomost skill and power to crush her industries. It is painful to go through all that England deliberately did to injure India. Mr. Montgomery Martin felt for India, having lived with the people for a long time, he came to love them and we read with wonder, passages expressing his love for the people and abhorrence for the injustice done to her by England.

As I conclude, my eyes are turned to the Yeravada gaol—inside the iron-bars of which lies encaged the mortal frame of the patriot-saint of moderm India, the purest and noblest soul that ever drew breath, he who thought out and preached and lived the gospel of India's salvation. Though to our infinite sorrow and shame his mortal frame still lies, there, we know his spirit ever with us, ever ready to rouse us and inspire us whenever we are lapsing into inertia. May that spirit and that shining example ever lead us on in our quest freedom ; May we ever be worthy of our great Exemplar: MAHATMA GANDHI KI JAY;

FOOT-NOTES

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Similar ideas have been given vent to by Tolstoy and other eminent Russian writers,

"........ The extreme poverty of the country was not due so much to the unequal distribtion of land, nor to a false economic tendecny as to the rather premature influx of European Civilisation with the Railways, producing an exaggerated centralisation in the cities, creating new luxuires end new industries at the expense of agriculture, and further introducing the huge credit system with its concomitant stock gambling."

"Their present Railways called into existence not by an economic but by a Political necessity, were detrimental to agriculture, they brought in their train the development of industries and the system of credit to it. Just as the over-development of one particular organ in an animal would be a hinderance to the general development, so.all these factors; unquestionably necessary in Europe that was ready for them, were a hinderance to the general development of the wealth of Russia, because it removed the important and pressing auestion of organising agriculture".

"...... The question at this moment is whether we have not weakened. 'The springs of life' by the extention "of Railways ?"

"Not Railways properly speaking .... but the general tendency of which Railways may be considered as the outward merical ;" groans some solitary thinker. 'Undoubtedly it is, but the noise of waggons bearing bread to starving humanity is of more value than tranguility of soul,' replies another triumphantly and passes on with an air of pride. As for me, I don't believe in these waggons bringing bread to humanity. For founded on no moral principle these waggons Hay well even in the act of carrying bread to humanity coldly exclude a considerable portion of humanity from enjoying it that has been seen more than once ...."

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* Presidential address at the opening ceremony of Khadi exhibition–Coconoda, Dec. 25. 1923.

A Programme of Co-operative Development*

My association with the co-operative movement, however unobstrusive and casual it might be, has convinced me that in our present peculiar circumstances, co-operative societies furnish one of the most effective means for the improvement of the economic condition of the vast mass of Indian people. Although scientific study and research have so far claimed my foremost care, I have not been wholly unconcerned with the problem of economic uplift of the Indian people. It is, perhaps, this more than any thing else that has led you to requisition my services for the present function. I am afraid, it will not be possible for me to advise you or enlighten you in your discussion on matters relating to administrative and technical details. What I propose to do, therefore, is to offer some observations as to how the co-operative movement may be utilised in an effective manner for the social and economic well-being of our people and transformed into a genuine national movement.

Those who are familiar with the history of the modern development of the co-operative movement in countries in which it has taken root, will at once testify to its remarkable achievements in social and economic spheres during the last decade or so. In their work on *Economic Development of Modern Europe,* Ogg and Sharp give an excellent account of the progress made by the movement during recent years. "There is, indeed, no country of Europe," they say "in which the co-operative movement, has not attained considerable' proportions. The results are by no means confined to the diminution of expenditures, the increase of savings, and the amelioration of conditions of livelihood. The sense of social solidarity is perceptibly strengthened and labour is brought to a realisation of the highly important feet that the promotion of its essential interests may be attained by pacific and scientific means no less than by aggression and combat." While referring to the progress of the consumers' co-operative movement, the writers add : "At various junctures we have come into contact with the term 'co-operation' in connection with the economics of war and reconstruction. Nowhere, however, has the word meant more during the last ten years than in relation to the consumers' co-operative movement, the growth of which has been silent and largely unnoticed, but none the less remarkable. Organised labour and political socialism are mainly concerned in varying degrees with improving the lot of the producer of wealth; consumers' cooperation endeavours to prevent the exploitation of the whole population considered as the consumer of goods, not by any revolutionary process, but by the building up by slow and peaceful methods of new socially owned capital."

I specially emphasised this aspect of the co-operative movement in my address at the celebration of the International Co-operators' Day in Calcutta last year. I would like to repeat what I said at the time : "The industrial upheaval of the west has, after a century, just reached the soil of India, bringing in its train, many of its evils, and I ask you to believe me when I say that one bed-rock of hope in this age of convulsion is co-operation. You must also bear in mind that, inspite of the universal clash and clang in almost every country, the co-operative movement is gaining ground day after day, month after month, year after year. No narrow national and racial interests have been able to chain it down, its progressive career is still accelerating. The colossal International Co-operative Alliance supported by the big co-operative institutions of various lands, has linked up diflrent nations in one vast co-operative community, and we in India pride ourselves on being members of this world-wide brotherhood...... I invite you all to join this mighty movement, whose aim is to lift man's material life to a higher plane, to give to it a nobler, a more spiritual tone, and to bind together the races, creeds and classes of the earth in sacred and everlasting union."

It is often said with reference to the co-operative movement in this country that it has not so far been able to imbue members of co-operative societies and others associated with these bodies with the spirit underlying it. That there is considerable force in the charge so frequently brought forward against the movement in India by critics that it is chiefly considered as an agency for the supply of facilities for credit and looked upon by many principally from the point of view of material gain, nobody acquainted with its working will deny. But this is a complaint which is not peculiar to India alone. If you will take the trouble of going through the first article in the October number of the *Review of International Co-operation,* the official organ of the International Co-operative Alliance, you will find that a similar complaint is also made by the writer in respect of members and workers connected with the movement in advanced Western countries. And the writer of the article is no less a person than an ex-president of the Alliance.

"The co-operative movement has been," Mr. Goedhart writes, "generally regarded as a means of obtaining the necessaries of life cheaper than elsewhere, or as a source of a useful dividend at the end of the year which would afford to the poorer classes the opportunity of purchasing commodities of which they would otherwise have been deprived, and which the strictest thrift in the ordinary channels of expenditure could not have provided". "It is a very singular circumstance", he remarks, "that such an entirely erroneous conception of Co-operative principle should have held its own for so long a time".

If after working co-operative societies for over three quarters of a century promoters of the movement in educationally advanced and economically progressive countries in Europe and elsewhere find" the higher aspects of the cooperative movement lacking in it, it is no wonder that in India where education is diffused among so small a percentage of her population, and the movement has a life and history of not more than twenty-five years behind it, the conditions should be such as unfortunately they are.

It is much to be deplored that the members of cooperative societies and promoters of the movement are not actuated, to the extent that they should be, by the high and noble ideals that inspired its originators. What, however, is demanded is not a justification of the situation because the conditions in other advanced countries are also similar, but an earnest and organised endeavour to improve the conditions.

As you are all aware, the initial stages of the co-operative movement in India were devoted to the development of only its credit side. Although experiments in other directions have subsequently been attempted and efforts are being made for developing other types of co-operative societies, the progress achieved in these directions has, it must be admitted, been so far most inadequate. Even in the sphere of credit, considering the vast extent of this country and the almost abysmal poverty of the general body of our people, it cannot be said that the movement has been able to touch more than merely the outer fringe of the area to be tackled. This shows that much, very much, still remains to be done even for the development of the credit side of the co-operative movement. Whatever might be the imperfections of the co-operative movement as it has been shaped and organised by its promoters in India, it is undeniable that it has rendered signal service to a considerable section of the poorest people of this country by reducing the rates of interest and making credits available to them. But this does not go far enough so long as the people availing themselves of financial accommodation from co-operative societies are not able to acquire habits of thrift and to diminish their indebtedness by adding to their resources by productive means.

The indebtedness of the Indian peasantry has been variously estimated. According to the estimates made by Mr. Calvert and Sir Purusottamdas Thakurdas, the amount reaches such a high figure as 600 crores. It will not take you long to calculate roughly the figure that represents the heavy sum that has to be paid as interest on this huge amount, and the effect that this exercises on the future prosperity of the cultivator. It can well be imagined how this reduces the Indian cultivator to the position of one who is no better than a serf. The ryot is thus in blank despair. He knows that however hard he may toil, the fruits of his labour will be snatched away, first by the exacting revenue officer and then by the mahajan and the ubiquitous middleman. To him is presented the picture of Dante's Inferno, on the gates of which are written in bold letters, "All ye who enter here abandon hope."

You will thus see that matters have not much improved since the Indian Famine Commission reported after the disastrous famine of 1877-78 half a century ago, "how far it is possible for Government by its action, to diminish the severity of famines, or to place the people in a better condition for enduring them," however persistent and energetic might be the efforts that are made from time to time by spokesmen of Government in this country to prove that better conditions have intervened as a result of the economic policy that is being pursued by the British Government. As an English, writer on economic subjects points out in a recent publication, inspite of all that the British have done the vast majority of Indian population "live on the verge of starvation, at the lowest possible level of poverty, threatened by famine and pestilence".

There is no single solution to this deplorable condition. To me it appears that the promoters of the co-operative movement in this country should now devote their attention to a proper development of co-operative activities in directions other than the provision of credit which has so far, practically speaking, monopolised their attention. Methods should now be devised which would enable the people to add to their resources by creating new wealth as also to retain a substantial portion of the profits, now appropriated by the interminable series of middlemen who are to be found in every important or unimportant trade or industry.

Whatever the agricultural produce, cotton or jute or paddy or wheat, the cultivators should be encouraged to adopt co-operative methods of marketing. I desire to quote what Mr. Keatinge with his intimate knowledge of the agricultural and economic conditions of the Bombay Presidency, says on the possibilities of co-operative marketing in his excellent monograph on *Rural Economy in the Bombay Deccan.* He writes : "The possibilities of cooperative credit have already been considered. Those of cooperative marketing are not less great; but the subject is more difficult and needs more careful adjustment to the circumstances of each particular case. To work out an effective system of co-operative marketing suitable to any locality, to organise and sustain such a movement is a task which will require much patience and management. It may be hoped that when the co-operative credit movement is more firmly established some of the enthusiasts now working for that cause will look for new worlds to conquer and will turn their attention to the organisation of co-operative marketing, which offers so vast a field and promises so great a reward." "A common sight on a market day is a continuous stream of people pouring into the town often from distances of 15 or 20 miles each carrying a bundle of produce for sale, wood, grass; bhusa, or what not. The effort to the man is considerable, the value of the produce which he sells is often only a few annas. In the evening he will return home with a bottle of oil, a little salt and spices, or some such trifling purchases, and his day's labour is gone. With organisation the whole of the marketing which used up the labour of five or ten thousand people might have been done by one thousand and the remainder might have put a day's work on their land. To effect this we can only look to an increase of the co-operative spirit which in other countries has done so much to make marketing efficient."

Since Mr. Keatinge wrote in 1912, co-operative marketing has achieved impressive and striking results in American and European countries. In India we are just on the threshold of this movement. The situation here, therefore, demands more enthusiasm, more vigorous work and better organisation.

There should, I think, be organised effort not only for the development of sale and supply societies of the type mentioned by me for the marketing of our principal crops but when adequate experience has been gained in their working and these have become pretty widespread, attention should be directed to bring within the "co-operative" net, the numerous lesser crops. As has been already indicated, action in this direction has been taken in hand by the co-operative movement in some of the provinces — the Punjab has its dealings in wheat, Bombay, cotton, and Bengal, jute. About the work done in connection with the co-operative sale of agricultural produce in Bombay and the Punjab, the Royal Commission on Agriculture has made special mention. I have no personal knowledge of the working of these societies. But the reports that I have read of the results of this movement in Bombay and the Punjab and the accounts that I have received of the working of the new-born movement of my province for the marketing of jute and paddy from authorities whose testimony I cannot question, give me hope that if properly guided and developed this movement more than anything else can save the cultivator from his present pitiable position. These societies will not only help the cultivator in retaining a substantial portion of his profits that now goes to the middleman but by stimulating production will also indirectly help in creating new wealth.

There is another important sphere where our progress has been most inadequate, I mean industrial co-operatioa In their report, the Indian Industrial Commission, 1916-18, strongly emphasised the intimate connection between co-operation and the improvement of agriculture and cottage industries. The Royal Commission on Agriculture do not, however, seem to be optimistic in the matter. They think that to put it briefly, the possibilities of improving the condition of the rural population by the establishment of rural industries are extremely limited. With such a restricted outlook the recommendations of the commission in the matter cannot be expected to be of much practical help or use. Although the introduction of machine industry in Western countries has had the effect of practically destroying our cottage industries, my enquiries lead me to believe that by the adoption of vigorous measures it is still possible to resuscitate some of these industries and introduce new ones, if co-operative methods are applied. Without some such method I do not know how relief is to be afforded to the vast mass of our rural population, who are obliged to remain idle for 6 to 9 months in the year and need spare-time occupation.

Industrial co-operation, by which I mean such cottage industries as have already been developed for the manufacture of cotton, silk, wollen and jute goods; co-operative organisation of village artisans who formerly played a very important role in rural economy, but whose industries have been submerged under the tide of organised capitalistic exploitation; and many other productive rural industries, too numerous to mention; these, if developed, will help the production of new wealth. In this connection mention may be made of co-operative irrigation societies which in the words of the Royal Commission on Indian Agriculture are reported to have changed the whole outlook of the people and to have strengthened their economic position. Public Health societies like our anti-malarial societies would, by rousing the sanitary conscience of the people, by inculcating the principle of self-help and by improving the health of the people and the sanitary conditions of villages, check the enormous economic wastage due to disease, that is taking place at the present moment and thus indirectly help the production of wealth.

There are various other directions in which the cooperative movement may be utilised to help the vast mass of our unemployed and partially employed. It is true that the Consumers' Co-operative Movement has achieved very little success in India. But it is also a fact that wherever it has been brought into operation on right and proper lines, it has yielded very hopeful results. We have all heard of the achievements of the Triplicane Stores in Madras. In Bengal also there are stores which have worked and are working very well. The Co-operative Store at Gosaba (in the Sundarbans), in the district of Twenty-four Parganas, in the Zemindary of Sir Daniel Hamilton, is a striking example showing how co-operative concerns may be successfully managed. There are a few other stores in my province which have yielded similar results. In Bengal two societies have recently been formed, one in West Bengal in the neighbourhood of Calcutta and another in East Bengal, for the supply of electricity. The societies have just been formed and the results of .their working will be awaited with interest.

The co-operative milk movement in Bengal is a producers' movement. The little that has, however, been done there for the promotion of the co-operative supply of milk is very encouraging. Calcutta is not the only place in my province where we have such a society. The Co-operative Milk Societies Union in' Calcutta has, as its members, primary milk societies in the immediate neighbourhood of Calcutta, outside the limits of municipal jurisdiction. But elsewhere at Darjeeling and at Dacca also unions on the Calcutta model have been started. In feet the demand for the formation of such societies is so great that the staff at the disposal of the Co-operative Department is quite unequal to meet the situation. Those who have taken pains to scrutinise the working of these societies since their inception will bear testimony to the excellent results achieved by the movement. This has induced the Corporation of Calcutta to come forward to help it by rendering financial assistance with which the Union has been able to set up up-to-date machinery for pasteurisation and other modern scientific processes of treating milk before it is placed before the consumer for use. The methods employed by the milk societies have enabled them to improve their cattle, increase their productive capacity and introduce improvements in various other directions. In fact the Imperial Dairy Expert of the Government of India, Mr. Smith, is most eloquent in his praise of the system adopted by the co-operative milk societies in Bengal. We also find the Royal Agricultural Commission commending it to the notice of the general pubfit. "The experiment of this Calcutta Co-operative Society", they write, "shows what can be done by very small producers situated near railways and engaged in a high class trade. As a first contribution to the solution of the difficulties experienced by urban consumers, it is worthy of imitation wherever possible. Municipalities should follow the lead of the Calcutta Corporation, encourage the formation of central distributing societies and endeavour to arrange for groups of societies in all localities suited for milk production and having a good rail service." I have referred to this subject at some length because the problem of milk supply is not a local problem and it is a problem in the proper solution of which we are all vitally interested. If the Calcutta plan is a success, I do not see why it should not be tried elsewhere. The co-operative movement should now be strong enough to tackle the problem independently without waiting for help from Government when ft is not forthcoming and follow the policy which Denmark has adopted in the matter.

It will not be difficult for you to realise that if the economic condition of the vast mass of our rural population is to be improved by co-operative methods and effective and energetic measures are to be taken for such improvement, the agency required for this onerous work is not available. The staff that the Provincial Co-operative Departments have at their disposal is generally meant for credit work. For experiments is new non-credit directions competent men with special qualifications and an adequate number of such men are required. For the promotion of irrigation societies you require engineers, for milk societies you need properly trained experts conversant with the various scientific processes required for the treatment of milk; for health societies you require trained sanitarians; for sale and supply societies you require trained men with business aptitude, and for all these you need honest men, having love for their work, conversant with the principles of co-operation and devoted to the cooperative movement. The question now is, where and how are we go to get such men? This brings me to the question of education and co-operative training.

The striking progress of the co-operative movement noticed in Western countries is due principally to the great emphasis that its promoters place upon its educational aspect. As you must all be aware, the Rochdale Pioneers resolved that apart from the modest subscriptions of their members the entire surplus of their mutual trade should not be distribiuted to the members but should be kept partly as a reserve and devoted to the extent of IV* per cent, for the promotion of education. The education that they had in view was that of instructing the community in the advantages and benefits of co-operation, that is to say, in genuine propaganda for the ideal, and afterwards when the recruits had become established members of their society, in training them to become real co-operators."

Mr. Goedhart, to whose article I have already referred, points out that by following this method, co-operators in England and elsewhere in Europe have "obtained the means of developing their movement and extending its ramifications from the supply of food to clothing, housing, credit, insurance, indeed to the satisfaction of practically every human need," and that "the organisation of wholesale co-operative trading and productive enterprises under the control of federated consumers' societies, and the import of nearly every kind of goods have become the ordinary activities of a well-organised co-operative movement in nearly every country."

"This vast extension of activity and successful growth has not been undertaken merely in order to obtain a greater margin of 'profit' or surplus, but in order that co-operators might make the movement they love, serve the common good of everybody and thus raise human society to a higher level. Those who have not understood the true basis of the cooperative movement, or who were too much prejudiced against it to ascertain the truth, have entirely misrepresented Co-operation, and not the least in those cases where they have wished to limit its province to the amelioration of conditions of life to the poorest and most unfortunate. No, it was not for a few of human kind that Co-operation was intended to be the noblest means of improvement but for all.

"Each for all and all for each" is the universal motto of the movement, and clearly indicates that Co-operation was and is, the practice of the idea of social solidarity. Very slowly this idea has become understood amongst thinking men. So was it understood by the great William Ewart Gladstone, who once said to Sir William Maxwell, "So long as you cling to the principles of Co-operation, I am without fear for the future of my country. The help which a man gives to himself is always the best."

It is true that some of the Provincial Co-operative Institutes and Registrars of Co-operative Societies in India have now begun to realise the importance of improvement and extension of education and training with reference to the proper diffusion of co-operative principles in their areas and have turned their attention to the solution of this emergent problem. But all that they have attempted to do so far is nothing better than a mere tinkering with the question.

The whole problem of education has such an important bearring on the future development of the country in all its varying aspects, social, economic, political, moral, sanitary, that I hope you will bear with me a little longer if I dilate on the subject, which is one of such absorbing interest to many of us.

You cannot but admit that the intent and purpose of the modem economic system is totally incompatible with the spirit underlying the co-operative movement. For, while the guiding motive of the present economic system is profit and material gain, the co-operative movement stands for communal service, equality and brotherhood. Human institutions in a society are, barring special cases, moulded and shaped by the ideals and traditions that inspire the general body of population. This is true no less in regard to educational institutions than in regard to others.

It is futile to expect any rapid and proper development of the genuine co-operative spirit so long as India is not able to introduce a system of education of her own, — which the present system is not, — a system of education which should besides be in consonance with the spirit and guiding motive of the co-operative movement.

I must make it clear that by education I do not mean mere literacy. A proper system of education if it is to fulfil the objects that national system of education in a country fulfils, should be related to the real life of the people concerned and be suited to their needs and requirements. It should help them in achieving their aspirations and developing their character in accordance with their ideals. This purpose cnnot be served by an educational policy not formulated by the children of the soil and imposed on a subject race for reasons of administrative exigency.

I will illustrate my remarks with an anecdote that the great American industrial leader, Henry Ford, relates in one of his two remarkable books *My Life and Work* and *Today and Tomorrow.* A highly educated Persian who, we are told, had taken several degrees both in Europe and America, was the master of many languages and had finished four years of special work in one of the leading American Universities, was some time ago on a visit, before he returned to Persia, to one of Ford's Trade Schools, the object being to find out how he could help his fellow countrymen. Ford had at that time under his employ a large number of Persians along with students from other Asiatic countries. At the close of his visit the Persian made a significant confession to the Director of the school. He said to him, that he had begun in words and ended in words and that when he would go back to his country he would have nothing to offer to his countrymen. This was the plight in which many of our youths, whether educated in this country or in foreign lands, found themselves at the threshhold of their lives; and it was time efforts were made to remedy this deplorable situation by bold and drastic methods.

While dealing with the problem of education and cooperative training we must bear in mind the fact that if cooperative societies are to devote their attention only to the solution of the problem of primary education, as some cooperative societies appear to think that they should, the benefit accruing to the community therefrom would be realised, not presently, but, perhaps, partially, at a distance of twenty or twenty-five years hence. What therefore, is needed, is that a well-considered scheme of adult education should be devised and efforts should be made to bring it into effect at once and that steps be taken to introduce such education all over the country on an extensive scale. As the Report of the Royal Commission on Indian Agriculture states, "such a development would antedate by at least a generation that great advance in literacy which in our view is essential to progress in all directions."

In addition to this, steps should further be taken for the training of the staff employed for carrying on the work of cooperative societies of all descriptions. This work should be undertaken by the co-operative movement itself when adequate Government assistance is not forthcoming. The cooperative movement in India should now become more self-reliant and efforts should be made for releasing it from the leading strings of Government Departments. If the cooperative movement in this country is to be a real, popular, national movement, that we all desire that it should be, cooperative societies and their spokesmen should adopt methods that have made it so elsewhere and have at the same time enabled its promoters to run it as a beneficent movement, conducted, on independent and up-to date business lines in Western countries.

There is a small book entitled *Co-operation* in Denmark published by the Co-operative Union, Manchester, of which the authors are Lionel Smith-Gordon and Cruise O'Brien, which, I am sure, many of you have read. The writers state that before the rise of the co-operative movement the Danish peasant was almost a serf and the agricultural industry was threatened with grave danger, if not extinction. The book shows how by co-operative methods the economic condition of the country has been transformed almost beyond recognition in this short space of time and Denmark at the present moment is regarded to be one of the most flourishing among the countries of the world and her peasantry are a happy and contented community.

It is his excellent though brief introduction to a recent work on *The Folk High Schools of Denmark and the Development of a Farming Community,* Sir Michael Sadler describes in his inimitable way the circumstances that have contributed to the remarkable change in the tone and temper of the rural population of that country as also to the phenomenal development of the co-operative movement among them. "The farmers of Denmark have," Sir Michael states, "won the admiration of the world by their alert courage in quickly adapting themselves to changes in economic opportunity and by the intellectual and moral power which they have shown in their successful achievement of many-sided co-operation." In answering the query : to what is due this remarkable transformation of a people who before the introduction of the co-operative movement were "..... unprogressive; sullen and suspicious; averse from experiment; incapable of associated enterprise;" Sir Michael says: "The secret is open. Character, as Goethe said, makes character. A group of great-hearted patriots moved their fellow countrymen by their teaching and by their example. Their teaching was not occasional but systematic; and their precepts were distilled in corporate life. Danish experience confirms the truth of the epigram : 'Educational bonds make the strongest ties'."

I know that our difficulties are more arduous, our hindrances much greater. For we have to contend with our numerous indigenous, internal troubles besides attempting to extricate ove.rselves from the paralysing grip of a foreign bureaucracy, joined to the benumbing embrace of a soul-killing economic system. But no hindrances are so enormous that they cannot be overcome, no obstacles so immense that they cannot be surmounted. When others have elsewhere succeeded in conquering difficulties similar to ours, there cannot be any reason why we too should not succeed. The enterprise in which we are engaged is one of the noblest that can engage the activities of man.

Source : The Bengal Co-operative Journal : vol-XTV, April-June—1929

* Presidential Address at the Sixteenth Bombay Provincial Co-operative Conference held at Bombay on March 2, 1929.

The Co-operative Movement: Its Principle, Its Ideal and Its Historical Setting”

Strikes have become almost the order of the day; a huge wave of unrest seems to be passing over the labour world. This wave, the origin of which may be traced to Europe, has of late spilled over its borders and is beating against the shores of India. We in Calcutta have quite recently been forced to feel its impact on our daily life at our very doors. What is at the root of these strikes? The clash between labour and capital; that is, between people who after drudging for hours on end are dismissed with a pittance hardly enough for the bare necessaries of life and people who lord it over them and enjoy the fruits of their labour, because of a lucky accident of accumulated wealth, earned or inherited. An enquiry into the origin of this inequality would take us, across the space of nearly a century and a half, far afield to Europe, of the late eighteenth, and of the early ninteenth century. The fifteenth and sixteenth centuries in Europe witnessed a great awakening, known as the Renaissance, in the intellectual domain of man. And it was accompanied by corresponding advances in the other departments of civilisation. An equally great revolution was introduced by the eighteenth century in the practical sphere of human activity. The discovery of America by Columbus and the invention of telescope by Galileo during the Renaissance opened to man's wondering gaze a new heaven and a new earth and led to a sudden expansion of his physical as well as his intellectual horizon. The range of man's imagination was widened and his energy, inspired by his imagination, hungered to take in the entire globe. This energy

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* Translation of the Presidential Address delivered in Bengali at the International Co-operators' Day Meeting, held at the Albert Hall, Calcutta on July 7,1928, under the auspices of the Bengal Co-operative Organisation Society.

found a concrete expression and a definite channel to flow along in the last quarter of the eighteenth century. You all know what a tremendous cataclysm the French Revolution was. But simultaneously with the succession of the dramatic happenings which brought about the French Revolution, certain events were taking place in the industrial and economic world, which were destined to transform the entire character of human civilisation. These events, since known collectively as the Industrial Revolution, brought about a more radical change in human affairs than any previous series of events in the same period of time and let loose forces which still work on us gathering volume with the passage of time.

Ever since he first appeared on this planet man has had to fight hard and incessantly with nature to be able to live. Time was when he roamed about naked in the forests, living on the fruits of trees and the flesh of animals killed with blunt stones. Gradually out of the blunt stone he shaped a sharp-edged weapon and learnt to weave doth to cover his naked body with. Thus step by step he has acquired and developed the art of utilising the raw materials of the earth for meeting the needs of his person and his intelligence, ever unfolding, has built up civilisation by discovering daily nobler and more refined ways of living.

The Industrial Revolution was one of the greatest steps in this progressive process of human development. It ushered in the age of machinery which, worked at first by steam and then by electric power, led to the establishment of big factories and large-scale business. The enormous output of these factories were transported to the corners of the earth, by land and by sea, by rail and by steamer. Commerce spread from country to country, from continent to continent. Men, the world over, were knit together by a newer bond of unity.

It is a great good, undoubtedly — this bond of unity. But we have come to realise also the great evils industrialism has brought along with this. The clash of interest between labour and capital which is at the root of strikes, the spirit of jealousy between nation and nation which is at the root of war, owe their origin to industrialism. The conflict began in this way. With the invention of machinery men with money founded factories, where a handful of men could perform in a handful of hours the work that formerly scores of men took days of hard labour to finish. Peasants and craftsmen, tillers of the soil and handloom weavers, men with considerable freedom but with, at best, an uncertain income to depend upon, were lured to these newly founded factories by the prospect of a certain income. And they flocked in, in large numbers, as day-labourers, sacrificing their freedom for a fixed wage that was barely sufficient for life's most elementary needs. Another consequence of the Industrial Revolution was the creation of a class of midlemen who supplied raw materials to these factories and sold their finished products to the buying public. This body of go-betweens robbed both the producers of the raw materials used by the mills, and the consumers, who used the finished products, of the greater part of their bargaining power and reduced them to a position of utter helplessness. Industrialism increased the prosperity of the country as a whole, to be sure, but the lion's share of this prosperity went to a small and wealthy section of the community, enriching the already rich and impoverishing the poor. Thus the gulf separating class from class was widened and the inevitable consequence was the birth of an intense unrest which found expression in revolutionary doctrines and much bitter agitation. Men began to ask themselves; Is the goal of Industrialism to oppress the poor? Is the immense power that machinery has placed in the hands of man to be employed only to create divisions in society and separate man from man? Is this the ultimate end of science? Is the glorious hope, so long cherished, of an emancipated humanity to find such mean fulfilment? These are some of the profound problems of the Industrial age. What is the solution?

Let there be free and unrestrained competiton between producer and producer and between the producers and the consumers, and all wrongs would right themselves, suggested a few. For they argued, the spirit of competition in the economic field, a counterpart and a corollary of the biological struggle for existence, is innate in human life, and so long as there is no artificial check on this natural and healthy tendency, the economic balance of society adjusts itself automatically. The sphere of free competition, therefore, should not by any means be limited by curbing the individual liberty of man. This ideal of free and unrestrained competition based on the doctrine of individual liberty permeates the entire history of economic thought and action throughout the nineteenth century.

But to the toiling, starving masses, this doctrine afforded little solace and offered little hope; for ill did the gospel of individualism suffice to counteract capitalistic ascendancy and oppression from which they suffered. The result was that a rival doctrine gained a large and influential following and was set, in sharp and bitter antithesis, against the philosophy of free competition. The only way out of the iniquities of industrialism , lay, according to this school of opinion, in the control of commercial interests and the regulation of both production and distribution in the interest, not of a Class, but of the community as a whole. And, in an age swept by the rising tide of democracy, it was naturally thought that the State which was the community politically organized and which worked through its agent, the Government, was the only which could be trusted with the supreme direction of the economic activities of a people. The protagonists of this proposed new system pointed out that only through such a drastic change could destructive competition be checked and the people as a whole, irrespective of persons and groups, could be made to enjoy the blessings of industrialism purged of its evils. This theory known as Socialism or Communism has been advanced against the former doctrine called Capitalism by the Socialists. The Socialists, under the leadership of Marx in Germany, of St. Simon and Fourier in France, and of Owen in England, declared war against Capitalism and invited the workers of the world to unite and join in this fight. The conflict thus begun has continued unabated since.

But in the midst of this conflict we find there was an attempt at evolving a principle which will harmonise these two rival doctrines. All the evils of industrialism could be remedied if it were possible to form an association based on unlimited personal freedom whose aim would be to supply the daily wants of its members by joint purchase, at wholesale rates, and by joint production, of common necessaries; or by making arragements for the joint sale of goods produced by them to eliminate the middlemen; or again, to replace the capitalists by taking over itself the task of conducting factories for the benefit of its members. This, in brief, is the well-known doctrine of Cooperation.

It was in highly industrialised England that this principle, in an experimental and rudimentary form, was first applied, among workers, by Robrert Owen, one of the Socialist leaders. Himself a rich owner of factories Owen was singularly free from the besetting sins of capitalists. He desired to organise an ideal co-operative colony with the men in his employ as members. But his ideal did not materialise, for he was one of those crazy idealists who can direct but know not how to follow their own directions, who can point but never lead the way, who can sow seeds but lack the practical knowledge required for nurturing them into fruitful trees. His dream, however, was realised in his life-time when in a small town of his own native England, twenty-eight weavers, following his example, established a co-operative store for the joint supply of their daily wants. It was a gloomy December evening in 1844 when the tiny store started business in a dingy room, lit with a candle, in a narrow lane of the obscure town of Rochdale. Rochdale has since become famous in world-history and the candle, lit that December evening by the Pioneers, has burned with ever brighter flame illuminating England and radiating into countries beyond. England can today boast of 1300 co-operative stores, with a membership exceeding 50 lacs. The members of co-operative organisations throughout the world number over 30 millions. In almost every western country there is a big central wholesale store comprising various smaller organisations; and a huge international wholesale store, with the national societies as its member forms the apex of the whole system, There is hardly anything that is not available in these stores, and in most cases the goods are manufactured or produced in factories or fields managed and owned by the societies themselves. Tea gardnes, fishing smacks, flour mills, furniture factories, pasture lands, dairy farms—there is hardly any possible source of supply or manufacture that these stores lack. But they represent only one aspect of the co-operative movement, the aspect known as consumers' co-operation, i. e. the co-operation of purchasers, as distinct from that of producers.

In England, where consumers' co-operation has attained phenomenal development, it has immensely benefitted poor English workers. In Ireland and Canada, on the other hand, peasants have advanced rapidly through the co-operation of producers. The peasants in these countries have combined to facilitate agricultural operations, and marketing their own goods through their own sale organisations, have been able to defy and defeat the formidable rivalry of capitalistic combinations. They stock their crops in huge godowns, load and unload them by means of Totty elevators and send them for sale when necessary to places far and near. They do not allow others to rob them of the wealth produced by the sweat of their brow; and they never waste their time wailing over their misfortune. They owe their power and prosperity to co-operation.

Yet another phase of co-operation has been specially developed in India. It is credit co-operation and its need is most acutely felt in a country mainly agricultural as ours is. Factory labourers slave for the whole day and live from hand to mouth; they are but tools in the hands of the capitalist employers. Peasants, from this point of view, are better off; they are their own masters. But they have to depend on the vagaries of the weather, on the whims of nature. They do not earn a penny in the long interval between the operations of ploughing and sowing, on the one hand, and those of harvesting and marketing the crop, on the other. So in most cases they must go for credit to the money-lender who sees the opportunity and extorts an exorbitant interest. Very little is left to the peasant of the sale proceeds of his crops after meeting the money-lender's heavy charges. So the next year, in the sowing season, he must approach the money lender once more. But what actually takes place in a large number of cases is still more appalling. The sale proceeds are not enough to pay up the interest even, not to speak of the principal. The interest thus goes on accumulating from year to year at a compound rate. To crown it all, fresh borrowing must be made, for man must live. So demands go on increasing briskly, but the source of income remains as limited and as precarious as ever.

To lift the peasantry out of the morass of indebtedness, credit co-operation was first started in this country in 1904. But it originated in Germany, in the 19th century, when two. noble souls, Raiffeisen and Schultze, first applied it, to save the German peasants from the clutches of usurious Jews. Without going to the money-lender, peasants may get loans at reasonable interest from banks or other organisations, if they accept joint responsibility, in groups often or more. This is the basic idea of credit co-operation which has made rapid progress In India, where there are today near about a lakh of credit societies, of which Bengal can claim over fifteen thousands. The rate of interest, which was at one time 30,40 or 50 percent and rose at time to 150 or 200 per cent, has now come down to 15 or 20 per cent, thanks to the benevolent rivalry of the network cooperative credit institutions that covers the country.

If it the case then the troubles of the peasantry are over? The people of Bengal, mostly agricultural, number 45 milions in all; but the members of various co-operative societies in Bengal are barely 6 lakhs in number. Supposing each of this number represents a family and each family consists of five persons, it means that only 30 lakhs, i.e. a mere fifteenth part of the whole population is associated with the co-operative movement. The figures for the whole of India follow almost the same proportioa It is to be noted that it is only credit co-operation that has made any real advance in India. Compared with it, the other types of co-operative activity are almost insignificant. But we must not forget that the need for loans, admittedly the greatest, is not the only need of the Indian peasant, and the money-lender is not the only lion in his path. The one way to his prosperity is the thorough overhauling of agricultural conditions. But that way bristles with difficulties, each one of which has to be fought and removed. So the Indian peasant today, like his compeers in Denmark and Canada, must organise huge sale and supply centres, and stand up fearlessly to the powerful merchants and middlemen. Otherwise life will become problematical in these days of hard struggle for existence.

It is a pleasure and a pride to me to be able to announce to you that the Bengal Co-operative Organisation Society, which is the centre of co-operative activity in Bengal, and under whose auspices we have met today, has already begun work in this line. Jute is Bengal's monopoly and out of its manufacture, the mill-owners make enormous profits and roll in wealth by draining the country dry. The Bengali peasants who produce jute were so long completely under the joint thumb of alien merchants and indigenous middlemen. But, at last, arrangements have been made to sell jute in the co-operative manner. Sale centres have been opened in various places with a big central organisation, the Bengal Co-operative Wholesale Society, co-ordinating them all, in Calcutta. In Bombay also, efforts are being directed to organising the cotton-producers in a similar way. And the success that has attended the recent institution of co-operartive sale centres in the two distant provinces in India is as encouraging as rt is hopeful.

It is without doubt highly desirable that the principle of cooperation should spread among peasant in a country in which the majority of the. people depend mainly on agriculture. But for an all round uplift of the people it is necessary that all communities,—educated, uneducated, labouring, training,—must join this movement. Unfortunately, our middle-class has not shown adequate enthusiasm in this directioa Today I exhort you all, specially the educated youngmen, to participate in this movement, yourselves to found co-operative societies and to preach the gospel and glories of co-operation all over the land.

I have referred at the outset to strikes and labour unrest. The industrial upheaval of the west has, after a century, just reached the soil of India, bringing in its train, many of its evils. and I ask you to believe me when I say that one bed-rock of hope in this age of convulsion is co-operation.

You must also bear in mind that, inspite of the universal clash and clang in almost every country, the co-operative movement is gaining ground day after day, month after month, year after year. No narrow national and racial interests have been able to chain it down, its progressive career is still accelerating. The colossal International Co-operative Alliance supported by the big co-operative institutions of various lands, has linked up different nations in one vast co-operative community, and we in India pride ourselves on being members of this world-wide brotherhood. Six years ago, in 1923, the International cooperative Alliance inaugurated this day as a symbol of international unity. Today, at the sixth celebration of the International Co-operators Day, I invite you all to join this mighty movement, whose aim is to lift man's material life to a higher plane, to give to it a nobler, a more spiritual tone, and to bind together the races, creeds and classes of the earth in sacred and everlasting union.

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* Source: The Bengal Co-operative Journal:
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Courtsey : Pinak Pani Dutta

".....I trust that the fire which it has been our lot dimly to kindle will be kept burning on from generation to generation of our students, gaining in brilliance and volume and intensity till it will have illumined the whole of our beloved motherland."

— P. C. Ray

Dr. P. C. Ray on the Cult of Charka

The following is a report of Dr. Ray's speech delivered at the Suro Seva Samity as far as the *Charka* problem is concerned :–

I confess when Mahatma Gandhi first promulgated his cult of *Charka* I looked ashamed and shook my head. Anyone has only to visit the Banga Lakshmi Mills and watch the revolution of the spindles per minute and see what modern machinery can achieve. I must confess I have to revise my estimates of *Chakra*, especially in view of the lessons I have gained from the Khulna famine. The area which is in the grip of the famine is knows as the region of one-harvest (ekaphasaler desh) the Aman paddy. The peasantry, and they constitute more than 95 per cent. of the population, work only for about 3 months. In fact, indolence is the besetting sin of the people of Bengal. Barisal (Backergange) is known as the Granary of East Bengal, and even the failure of a single crop brings on famine condition. And, as is well known, it taxed all the energies of Aswini Babu and his co-workers to save them from starvation not long ago. Now the population of Bengal is about 45 millions of 4½ crores. Even if we leave out of consideration 3½ crores and pin our fate on one crore of able and willing workers (men and women) and if they earrn only half-anna per day by spinning or Re.1 per month, this would yield us one crore per month or twelve crores rupees earning per year. There is no reason, however, why one should not earn Rs. 2 per month in the above manner. This would add twently-four crores of rupees to the income of the people. Political Economy tells us that one should not waste his time over uproductive undertaking if he can utilise his time more profitably. But here you have to deal with a people who are notorious for their indolence and who have no alternative occupation or industry to fall back upon in times of such dire distress. And I am of opionion that the 'Charka' should prove the salvation of such people. As some of you are aware I am intimately associated with more than half a dozen industries in which up-to-date plant and machinery play a prominent part, and I have just been dragged from a meeting of the

Assam Paper Mills of which my humble self happens to be the Chairman of the Board of Directors and in the flotation of which I have been working hard, so I could not be accused of any undue partialilty for home industries on a small scale in contravention of the shibboleths or canons of Political Economy.

Modern Review, Jan-1924, p. 653

UNHAPPY BENGAL

"While the six provinces where congressmen are in office are vying with one another in releasing political prisoners,withdrawing repressive measures and in various other ways embarking upon a policy of conciliaton, the unhappy Bengal presents a most sorry and humiliating spectacle," said Acharya P. C. Roy. in an interview with "United Press" on the situation arising out of the hunger-strike of the political prisoners in the Andamans.

Acharya Roy continued : "The attitude of the Bengal Ministry is as cruel as heart-rending. It passes my understanding why they should insist on observing a vindictive attitude. The hunger-strikers in the Andamans have a positive grievance. No Government calling itself enlightened and representing the public should remain indifferent to it. I cannot, for the life of me, understand how the Hon'ble Mr. A. K. Fazlul Huq, who was all along calling himself a people's man and condemned in no unmistakable terms the treatment meted out to political prisoners by his predecessors in office, should now reconcile himself to the attitude which has been taken up by his Home Minister. However, it is the duty of the public to carry on a most vigorous and intensive agitation on behalf of the unhappy yougnmen who have been driven to exasperation and are dying by inches in the hope that their countrymen will stand by them will stand by them in this hour of dire and supreme crisis in their life. (United Press)

Amritra Bazar Patrika, Aug 8. 1937

* Acharya Roy's interiview on Andaman situation on Aug 7. 1937 as reported in the Amrita Bazar Patnka on Aug 8, 1937 is reprinted.

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Education

Presidential Address*

I highly appreciate the honour you have done me by inviting me to preside over the Silver Jubilee of the Marwari Siksha Mandal. 1 have been for nearly half a century a teacher in the two premier institutions of Bengal—the Presidency College and latterly the University College of Science, and my activities have mainly been confined to the higher branches of scientific studies. But ever since 1921—the year of the great upheaval following in the wake of the Non-co-operation movement,—my attention has been directed to what has been called the national system of education as a basis for the attainment of Swaraj. 1 was so much under the spell of it that I unhesitatingly declared that *Science can afford to wait but Swaraj cannot.* I threw myself heart and soul into the organisation of national schools primarily in Bengal and to a limited extent in the different parts of India. 1 was asked to preside over the Jamia Millia Islamia (National Muslim University) as also the Vidyapith of Ahmedabad when Mahatmaji was an inmate of the jail of that very place.

At the very outset I was struck by the fact that the educational system in vogue for nearly a century in Bengal, *i.e.,* since the foundation of the *Hindu Maha Vidyalaya* (the old Hindu College) by the efforts of David Hare, Rammohan Ray and others, had taken such a deep root in the soil that the minds of the teachers some of whom had given up lucrative appointments under the Government could not be drawn aside from what they had been taught under. These schools soon became *replicas* of the schools under the University—though labelled *national.*

Moreover, Bengal is par *excellence* the land of a highly emotional people. Under the spell of patriotic fervour thousands left the *Golumkhanas* as they were nicknamed and joined these schools which sprang up like mushrooms all over the province. Most of these were located in huts improvised out of ordinary bamboos and straws. I was often a guest in some of these. But there was no abiding faith underlying the movement. The enthusiasm began to flag and the guardians of the pupils began to shake their heads. Affiliation to the University has been a condition indispensable to the existence of our schools, as they are regarded as tributaries to the colleges preparing for the degree examinations. The Bengali has always looked upon the 'Varsity Hall-mark as the passport to a successful career in the Government services as also in law, medicine, engineering—the professions as they are called. Naturally the movement was short-lived; it blazed up like a fire of straw and was soon a heap of ashes.

What has been spoken of Bengal applies more or less to other provinces and hence I shall take the liberty to trespass upon your attention for a moment to glance through the effort and the attitude of our ancestors nearly a century ago towards education.

In Bengal the battle between the Orientalists and the Anglicists ended in the victory for the latter with Macaulay's famous Minute. The protagonists of English education, however, hoped that if a class of educated Indians were created, they would themselves play a leading part in spreading the knowledge they had gathered among their less favoured countrymen—that the knowledge would by slow process of filtration spread from layer to layer reaching ultimately the masses. But the filtration process, as it has been called, has proved a failure. The educated classes not only in Bengal but in every province, have looked upon English education, as typified in senior scholarships, and latterly since the inauguration of the Universities in degrees, as opening up bright prospects in their careers. In fact, they have invariably lost touch with the masses and have ever deserted the villages and overcrowded the towns. The mass production of graduates on the factory system in our Universities has resulted in the unemployment and its bitter consequences.

It should, however, be noted that in Madras and Bombay there were not wanting men of wide vision and foresight to utter a protest though it fell on deaf ears.

Minute by JUGANNATH SHNKER SETT (1847)

I am persuaded to say that the vernacular languages possess advantages superior to English, as the medium of communicating useful knowledge to the people of Western India. It cannot be denied that they must have less difficulty in understanding whatever is communicated to them in their own language, than in a foreign tongue. When a native is inclined to prosecute the study of English, his progress is more rapid, and his usefulness doubled, provided he be first well-grounded in his own language. I say his usefulness will be increased, because it is only by this preparation that any knowledge he may have acquired can be imparted by him to his countrymen through the medium of the vernacular language. It is in my humble opinion an impossibility to teach the great mass of the people a language, such as English, so widely different from their own. If our object is to diffuse knowledge and improve the minds of the natives of India as a people, it is my opinion that it must be done by imparting that knowledge to them in their own language.

Views of MR. THOMAS (MADRAS)

But about this time (1853) the pendulum action so often observable in Indian administration began to swing forward again, and the authorities of the day, among whom the Governor Sir H. Pottinger, and Mr. Thomas, then Chief Secretary to the Government of Madras and also a Member of the Council of Education, were most Conspicuous, began to revert to the views entertained by Sir Thomas Munro, in favour of the Primary "Education for the masses having the first claim to assistance from the State. They were of opinion that the system which had teen adopted both in Madras and in Bengal Presidency and which contemplated the imparting of a high measure of education to the few, and exclusively through the medium of English, must fail to produce any great or general effect upon the national mind. Mr. Thomas' views deserve to be recorded even in the very brief outline that is given here. He declared that such' a system was a reversal of the natural order of things, and that the attempt to educate and enlighten a nation through a foreign language, was opposed to the experience of all times and countries, and that English must ever be in this land to the masses an unknown tongue.

"A smattering of English may be acquired by a considerable number about our towns, or in immediate communication with the few English residing in India; but the people (the women as well as men) will, as a whole, only think and speak and read in their native tongues, and their general enlightenment or education must, and, I believe, can, only be attained through this channel ; and a wide basis, therefore, of a solid, though limited, education, through the means of the vernacular languages, must be given to those classes which now receive education, before anything permanent will be effected.

"It is upon this broad basis alone that the superstructure of a high standard and refined education can, it appears to me, be raised; and the superior acquirements of the few very highly educated be made to tell upon and influence society. For let us suppose that we have some tens and even scores of youths, out of a population of millions, masters of the higher sciences, well acquainted with all the beauties of Shakespeare, of Milton, and with the learning of Bacon, and with the great master-minds of Europe and the rest of the people, not the lowest classes alone, left in their hereditary ignorance, and that ignorance, Asiatic. 1 cannot but think that the only result of a system which educates a few highly and leaves the rest of the population without even elementary instruction, is to render all the superior acquirement of that few (made moreover at an enormous cost to the State), barren and fruitless as to any general influence upon society."

I cannot conclude this chapter better than by repeating what I said at the convocation address at Mysore in 1926.

If we begin by critically examining our methods in India (not only in our University) the first outrage that we find we committed was to make a foreign language our vehicle of instruction. It is surprising that this principal reason of our intellectual sterility was not discovered till very recently, and it is still more surprising to find that some of our well-known educationists even to-day continue to regard the relegation of the English language to an inferior position as fraught with disastrous consequences. To avoid misconception I must here, once for all, make it clear that the study of English or other important foreign languages is by no means discouraged; they open up newer vistas of thought and ideal. A man of education must, in the first place, be one well up in all round information, and he can gather it best and in the minimum of time if he does so in a language he learned to lisp in, while sucking his mother's breast—the language of his nursery. Arithmetic, History, Economics, Politics, Logic, and Geography, in short the book of knowledge can readily be mastered in one's own vernacular. That should be the first stone in our educational edifice if we want to build well and high.

An educational authority on bilingualism in Bengal, Mr. West has favoured me with his opinion reproduced here: —

Late Beginning of Foreign Language.

" I believe that the reason why so much time is wasted on foreign-language-study in India is that the children begin to study a foreign language much too early. There is a common idea that the younger the child, the better he learns the foreign language. This may be true under the age of eight ; a very young child may unconsciously pick up a foreign language better than an older person can acquire it by study. But there is a great danger that such bilingualism in early childhood may be detrimental to the mother tongue.

" At present we teach English to vast numbers of children who will never really have a great need of English, and who are intellectually incapable of mastering a foreign language."

Then again, we lay too much stress on College education:

The true University of our days is a collection of books says Carlyle in The Hero as Man of Letters.

Mr. H. G. Wells adopting as his text the above dictum further amplifies it and pertinently observes:

" Now the frank recognition of the book and not the lecture as the substantial basis of instruction opens up a large and interesting range of possibilities. It releases the process of learning from its old servitude to place and"to time. It is no longer necessary for the student to go to a particular room, at a particular hour to .hear the golden words drop from the lips of a particular teacher. The young man who reads at 11 o'clock in the morning in luxurious rooms in Trinity College, Cambridge, will have no very marked advantage over another young man employed during the day, who reads at II o'clock at night in a bed-sitting room in Glasgow."

If one took a census of the greatest of world's men and women, I fear he would be surprised to discover that the majority of them owe very little to Universities or indeed to any educational system. Shakespeare knew little Greek and less Latin. Our Kesnab Chandra Sen and Rabindra Nath, Sarat Chandra Chatterjee, the prince of novelists and story writers, Girish Chandra Ghose, the foremost of our dramatists, never crossed the threshold of a University. Whilst on the one hand, however, the charge of moulding mediocrity in the University system is not altogether unfounded the current Emersonian aphorism that " Universities are hostile to genius," is, on the other hand, not wholly justifiable.

An Englishman, an educationist, who has entered into the spirit of Indian life exclaims with bitterness—

"Similarly, official suggestions for the wider use of the vernacular in schools have been attributed to a desire to restrict the teaching of English, and to revert to the policy of *divide et impera," The Education oj India,* by Mayhew, p. 71.

Continues this high authority: —

More important is the effect of the vernacular press and political emissaries to the non-English-knowing world. The efforts of politicians and journalists are undoubtedly giving an edge to the study of vernacular composition, and it is no longer fashionable for Indian politicians to assert, what is too often true, that they can express themselves more easily in English than in their vernacular. The enlarged provincial legislative councils contain many members who are unable to speak in English, and not a few who prefer to speak in the vernacular, in order to secure a wider audience within and without the Council chamber. Generally one may say that the number of Indians who need the gift of clear vernacular speech and writing, or who call on others for such gifts, is growing steadily." —*ibid p.* 198.

Meyhew justly observes that the vernacular literature is now destined to play an important part in the awakening of the masses. The *Ananda Bazar* and the *Basumati* in Bengal, the *Bombay Samachar,* and the *Sanj Vartaman,* the *Kesari* and the *Swadesh mitram,* not to speak of the numerous Urdu dailies in the Punjab, now exercise potent influence on the masses. One may gather as much information from a perusal of one of these as from the English dailies.

Moreover, a vast deal of literature has already sprung up containing up-to-date information on Japan, China, Persia, Turkey in Asia, Egypt, not to speak of European countries. I can confidently assert that, in Bengal, even among the graduates, not one in thousand, derives his information *direct* from the Ramayana of Valmiki and the Mahabharata of Vyasa. Among the Hindi-speaking people the matchless and inimitable version of Tulsidas captivates the mind and in Bengal even the much inferior version of Kirttivasha is read by millions.

Again, we gather our knowledge of Plato not by studying Greek from the original text, nor do we gather the views of Kant and Hegel by studying German, but from English translation.

I allude to all these, because, I have, sometimes, been taken to task for preaching the supreme necessity of substituting vernacular for English as the medium of education even in the higher classes.

Why then this mad infatuation for the English medium and the wastage of seven to eight years of the most precious period of a boy's or girl's life?

If I have devoted so much space to the discussion of this aspect it is because Mahatmaji wants us to mix with the masses on terms of equality—wants education imparted through the medium of vernacular as also the orientation in our mentality so that village life may be rendered attractive and that earning a livelihood and dignity of labour may be slowly and gradually acquired.

The first requisites are : —

(1) Improvement of agricultural methods so that two blades of

grass may grow where formerly grew one, which being interpreted in modern phraseology means the doubling of the produce of the land.

(2) Improvement of the cattle, especially of the milch cows and buffaloes.

(3) Application of modern methods to the age-long obsolete processes.

As regards these I shall speak from my own experience as gathered in some of our Khadi centres, notably in Sodepur near Calcutta and at Atrai in the district of Rajshahi. It is fortunate that- Mahatmaji has visited these in course of his tours in 1925 and 1927.

Last X'mas week from my cottage at Atrai watching all around I noted down: —

"I am surrounded on all sides by thousands of cabbages and cauliflowers, brinjals and radishes grown on irrigated and fertilised soil. My eyes are feasting on the pleasant sight. I can now appreciate the mood of mind of the Emperor Diocletian, who as Gibbon tells us, when he was solicited by Maximian to reassume the reins of government and the imperial purple, rejected the temptation with a smile of pity, calmly observing that, if he could show Maximian the cabbages which he had planted with his own hands at Salona he should no longer be urged to relinquish the enjoyment of happiness for the pursuit of power.

Agricultural pursuits must be made a source of profit and pleasure. But here comes the real difficulty. There is an inborn and inherent reluctance on the part of our bhadralok class to manual labour. In my own school and in a college in the district of Khulna we have secured Government grant and also the loan of a teacher well up in scientific agriculture. But, unfortunately, the boys as also their guardians have a horror of the plough and the spade and the tilling of the soil has to be carried on by engaging hired labourers, and it is found that on spending one hundred rupees or so, the produce of the land, when sold in the market, barely fetches rupees twenty.

I find many parallel instances in Booker Washington's "Up From

Slavery." The experiments on manual labour and education side by side as narrated in the Tuskegee University programme afford valuable suggestions for us. It should be remembered that they refer to the negro population, a few years after their emancipation. But the negros were inured to hard labour ; but even if their leader had to encounter such initial difficulties, we must be prepared for far greater difficulties.*

I am also quoting a few extracts from a small book by two eminent agricultural researchers at the Oxford University who had also intimate contact with agricultural problems in England. It is entitled " Back to the Land."

The small holder and his family enjoy no protection under the statutory regulation of hours of labour. There is no Saturday half-holiday for them, no overtime pay, no special rates for Sunday work. When the time worked by the small holder and his family is priced at the current rates of the Agricultural Wages Board, it is often found that their actual labour income is far below that which they would have earned had they been working'for wages.

It's nothing but work, work, work, morning, noon and night. I'm about sick of it all. But it's no use, we have to go on. I will tell something of what I did during the past summer and autumn. Of course, we are short-handed; most of the boys get into the nearest towns these days, and we are in the same fix as other holdings. The women are expected to take the place of the boys and do their own work as well."—The Countrywoman on *her* Day's Work *on a* Small *Holding.*

Success is a family concern, to which the small holder's wife and children must contribute. Whereas the wage earner has no more than a living, they have also a way of life. Against this, it can be argued that the small holder is working for himself and that the eight-hour-day means nothing to him if there is work to be done on his holding. He is his own master, his home is not a tied cottage, and he cannot lose his employment at a week's notice. His standard of life is that of the farm worker, but in status he is a farmer. Often he may feel that his foot is on the ladder, and sometimes, as will presently appear, he moves up it,"

It is necessary to bear the above in mind as there is a halo of romance encircling the agricultural occupation as affording a career for our youngmen.

The worker in the village must impose on himself a standard of life different from everything to which he has been accustomed. The urban-bred youngman has a fascination for 'buses, cinemas, football matches, paved roads, water-supply and sanitation. In other words, he must give up habits of luxury which he has imbibed from the town. Not only he has to accommodate himself to a lower standard of living, but he must impose both upon himself and his family a degree of frugality which only those who know him can appreciate.

Farming and dairying must go together as we have at Sode-pore and Atrai. Then, again, if we look at the export of cattle hides from the various ports of India, Calcutta, Madras, Bombay, and Karachi, we shall be staggered by the figures in crores of rupees at which these are valued. But our selfless and indefatigable organiser and worker, who, along with his life-partner, has dedicated himself to the service of the country, has recently started a " Harijan Tannery in a suburb of Calcutta.

Satis Babu, by his magnetic personality, has attracted a band of youngmen, recruited from chamars and bhadraloks including' high caste brahmins who are working whole-heartedly under the inspiration of their talismanic leader. He has also taken a lease of a *bhagar* and has proved to demonstration that apart from the hide which the dead cattle yields, the other products which, hitherto, were left to be devoured by vultures and jackals and the bones rotting in the field, are worth twice as much as the hide itself. The fat of the carcass extracted and purified finds a ready market and the bones and fleshy portions, when dried and pulverised in a disintegrator, are equally prized by the European exporters. Nor is this all. The hide is tanned into leather of superior quality and fetches much higher price than the raw material. Satis Babu has also improvised cheap hand-made machinery out of pieces of bamboo and wood so that every villager, be he a chamar or bhadralok can carry on the business near his homestead. Here is a source of wealth as yet untapped. Our educated graduates in science in their hankering after service or a soft job cannot be pursuaded to utilise their scientific knowledge to purpose. But here is an object lesson.

It is not the higher price alone that counts. The tanning process gives employment to numerous hands. In thevillage uplift work this aspect of the question should not be lost sight of. Our high caste youngmen have no hesitation in dissecting putrid human bodies in the medical institutions; why should they fight shy of cattle carcasses?

I have not touched upon the other successful undertakings of Khadi Pratisthan, namely *ghani*-crushed pure mustart oil, *dhenki* husked paddy; as also pure *ghee*, each and one of these items finds employment for hundreds of men and women.

In conclusion, what is wanted now is not one Satis Babu, but a dozen Satis Babus in various parts of India whose alchemical touch would convert the base metal into gold.

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* Presidential Address at the Silver Jubilee Celebration of the Marwari Education Society, Wardha, Oct 20, 1937

Ancient India

The following review of Mr. Vincent Smith's "Early sistory of India " appeared from the pen of Dr. Raty in the pages of The Indian World for June 1905 :—

Nature very often delights in paradoxes. Where we once feared that nothing much could be known, there we find ourselves overwhelmed with materials to-day. Up till a-little over a century ago, the mosaic cosmogony obtained currency in the European world but that cherished conviction received such a rude shock from the careful investigations of geology and palaeontology that it was exploded before the age of reason had firmly established itself. As in geology, so in history, the day of blind faith has gone by and Indian history is no longer the-sport of credulity and hypothesis. Though a people like the Hindus, with whom the world is a mere illusion and life a dream and who " let the legions thunder past, and plunged in thought again," could not be expected to take much interest in the passing events of the day or their future bearings, yet out of the fragments left by them has it become possible to construct a sober and connected history of this country from the earliest times.

Eighty years ago we had very little data upon Which to construct a history' of India, excepting the fragments preserved in the Writings of Arrian and Megasthenes. But the discovery of the Asoka inscriptions and their successful deciphering by Prinsep mark an important epoch in the making of a reliable History of India. The Asoka inscriptions have proved the foundation-stone for the magnificent superstructure of the story of this land. Thanks to the labours of suecessive generations of archaeologists and antiquarians; we have now abundant materials for a complete account of the early periods of Indian history. Like remnants of fossils and strata opening up a vista of research to the geologist, the rock-cut inscriptions and the Grseco-bactrian coins have opened up Wonderful fields wherein one can dig for any amount of materials regarding the history .of this country before and after the Christian era.

Another epoch-making event in this direction was the publication of Mr! Stanislas Julien's method for deciphering and transcribing Sanskrit names. This eminent student of Chinese literature took to the study of Sanskrit at an advanced age in order that he might follow with advantage the phonetic transmutations of Sanskrit names in the Chinese language. In the course of his Sanskrit studies he made the magnificent discovery that *Fo* in Chinese was no other than *Buddha* of India and that *po-le-mi-ii* stood *for para-mita* and *o-che-li-ye* for *aeharya.* Julien's monumen tal work on the Life and Travels of Huen-thsang (1853-8) remains still a standard authonty on the Sect, Deal's later English version having failed to repleace and supersede it. It is gratifying to find that a large number of French orientalists have followed in the footsteps of Julien and widned our vision of ancient Indian history by several brilliant contributions.

Apart from the graphic account in the itineraies of Fa-Hien, Huen-thsang I-t-Sing and U-Kong, we are now in possession of ample chronologicaldata from such sources as Pali and Chinese accounts and from the Buddhist *tripitaka,* some 1700 of which are mentioned n the valuable catalogue of the great Japanese scholar, Buniu Najio,—all of which go to elucidate many dark chapters and episodes in the history of India.

Although we have no regular indigenous histories or accounts of India as a whole, we have undoubtedly some very valuable local accouns. Kalhana's *Rajatarangini,* an excellentedition of which has been published by Dr. Stein, the history of Guzerat under the name of *Rasmala,* the Ceylonese Chronicles in Pali—notably the *Dipavamsa* and the *Mahavamsa*—all stand as oases in the dreary desert of indigenous account of the country.

The *Jatakas* or "birth-stories" also throw considerable light on the social and political condition of India of the 5th and the 6th centuries B.C. These have been turned into excellent account by Prof. Rhys Davids in his recent work on *Buddhist India.*

Mr. Vincent Smith's *History of Ancient India*-may be taken as a valuable supplement to Prof. Rhys David's *Buddhist India.* Mr. Vincent

Smith has already earned a well-deserved reputation for his numerous contributions to the numismatic literature of India. His monograph on *Asolca,* in Sir William Hunter's *Rulers of India* series, showed that he had studied the pre-Christian era of Indian History with considerable devotion and diligence. The present work, which he calls the *Early History of India from 600 B.C. to the Mahomedan Conquest including the invasion of Alexander the Great,* is a monument of masterly investigation and research on the subject. Mr. Vincent Smith has written this book with a view to present a "narrative of the leading events in Indian political history for 18 centuries," based upon the most authentic evidence,available, and everyone must admit that he has done it remarkably well. Why our author did not begin his work from an earlier period and include in it the times of the Vedas, the Ramayana and the Mahabharata, it is difficult to see. It is also a pity that Mr. Smith does not go into the details-of the life and times of Buddha, or of the supersession of the Brahmanic age by the Rationalistic one. A disproportionately large space of the book is devoted. to the marches, battles and armies of Alexander which is justified on account of "the exceptional interest of the subject" and also because they have "not been, adequately treated in any modern book."

The intellectual world has undergone considera ble changes since the days of Mommsen, Grote and 'Freeman in its conception of historical writings, and nobody, excepting professional military students, would care to sit down in these days to .read weary accounts of how Alexander crossed the Indus, arranged his cavalry and infantry on the Karri plain on the 'banks of the Hydaspes and gave battle to Poms, and; at what time of the day was the battle ended and how many were killed on both sides in that memorable engagement. The world will get none the. wiser to-day by acquainting itself with the dreary details of a military raid of over 22 centuries ago, and, even if it did, it would find in Mr. McCrindle's exhaustive translations of all Greek accounts of that event more. than enough materials for it, with various interesting informations relating to the people and the country besides. There is very little matter in Mr. Vincent Smith's

History which one will not find in Mr. Me. Crindle's series of translations, either in the texts or in the notes, and I wish that this event which bulks so largely in the pages of Mr. Vincent Smith had been compressed into half a dozen of pages instead. It is gratifying, however, to find the author of the book under review going into the details of the administrative organisation of the great Mauryas, including Asoka, the great Buddhist Emperor of India, of the rule of the Kushan or Indo-Scythian dynasty, among which figured the great Kanishka and of the story of the Gupta Empire :and the white huns. The story of the reign of Harsha forms an independent and a most interesting chapter in the work and, thanks to Huen-thsang's. *Travels* and of Cowell and Thomas' translation of *Sarsacharita,* we have a tolerably complete account of this period of Indian history. The last three chapters of the book deal with the mediaeval kingdoms of the north, from 648 to i2oo A.D., and of the kingdoms of the Deccan and the south. This portion of the book is very scrappy, and is attributable, as Mr. Vincent Smith himself says, to the " limited interest of merely local histories.' It is difficult not to join issue with an observation of this kind, seeing what materials Jhave been supplied to us for a complete and comprehensive history of India by *merely-local histories* and still less-apparently negligible fragments of history, preserved in stone, copper-plates, and inscriptions.

It also passes our comprehension to find Mr. Smith.' calling Delhi ' a modern city' and voting down the traditional glories of the prehistoric Indraprastha as. hypothetical. Equally objectionable is his description, of the Temple of Kailasa.at Ellora as an 'architectural freak.' Of sumptuous rock-cut caves and shrines, there is no end in India; and at one time that sort of temple-building was much in vogue all over the country. It does not; therefore stand to truth to-describe the Kailasa at Ellora as an architectural freak,'while indeed it records only the high-water mark of a phase of Indian architectural development. Nor any close student of Indian art, literature and philosophy would endorse Mr. Smith's opinion that the Dravidian nations of the south wer 'not inferior in culture to their Aryan rivals in the north,' a statement which the staunchest champion of Dravidian culture would not dare to advance in the light of known history. As to the *Ramayana* and the *Mahabharata,* it may not be possible to dignify them as sober histories, but at the same time to ignore them contemptuously as mere 'bardic tales' do not indicate any very intimate knowledge of their contents.

I make the folowing extracts from Mr. Vincent Smith's description of Chandragupta's administration :-

The administration of the capital city, Pataliputra, was regarded as a matter of the highest importance, and was provide for by the formationof a Municipal Commissioin consisting t\of thirty members, divided, like the War Office Commission of equal numbes, into six boards or committees of five members each. These boards may be regarded as an official development of the ordinary non-official *panchyet* or committee of five members, by which every caste and trade in India has been accustomed to regulate its internal affairs from time immemorial.

The first Municipal Board, which was entrusted with the superintendence of everything relating to the industrial arts, was doubtless reponsible for fixing the rates of wages. and must have been prepared to enforce the use of pure and sound materials, as well as the performance of a fair day's work for fair wages, as determined by the authorities. Artisans wer regarded as being in a special manner devoted to the royal service, andcapital punishment was inflicted on any person who impaired the efficiency of a craftsman by causing the loss of hand or an eye.

The second Board devoted its energies to the cause of foreign residents which in modern Europe are entrusted to the consuls representing foreign powers. All foreigners were closely watched by officials and were provided with suitable lodgings. escorts. and. in case of need, medical attendance. Deceased strangers wer decently buried. and their estates were administered by the Commissiones. who forwarded the assets to the persons entitled. The existence of these elaborate regulations is conclusive proof that the *Mayurya*

Empire, in the third centry B.C., was in constant intercourse with foreign states, and that large numbers of strangers visited the capital on business.

The third Board was responsible for the systematic registration of births and deaths, and we are expressly informed that they system of registration was enforced for the informationof the Government, as well as for facility in levying the taxes. The taxation referred to was probably a poll-tax, at the rate of so kuch a head annually. Nothing in the legislation of Chandragupta is more astonishing to the observer, familiar with the lax methods of ordinary oriental Governments, than this registration of births and deaths. The spontaneous adoption of such a measure by an Indian native state in modern times in sunheard of and it is impossible to imagine an old-fashioned Raja feeling anxious that births and deaths among both high and low might not be concealed. Even the Anglo-Indian administration with its complex organization and European notions of the value of statistical information, did not attempt the collection of vitalstatistics until very recent ties, and has always experienced great difficulty in securing reasonable accuracy in the figures.

The important domain of trade and commerce was the province of the fourth Board, which regulated sales, and enforced the use of duly stamped weights and measures. Merchants paid a license tax, and the trader who deatl inmore than one class of commodity paid double.

The fifth Board was responsible for the supervisio of manufactures on similar lines. A curious and not easily intelligible regulation prescribed the separation of new from old goods, and imposed a fine for violation of the rule.

Mr. Vincent Smith proceeds to place before his readers some further information on the duties of the Municipal Commissoners to keep in order "the markets, temples harbours, and, all public works" and also on the maintenancy by Chandragupta of an irrigation department "regulating the slucices" for distributing to every one his fair share of the watersupply of the town.

Had it not been for the fact that the narrative present above is corroborated by evidence of Megasthenes, Strabo, Arian, and other Greek "Writers, one would have taken it as a mere romance ."instead of sober history.

As might be expected of a great Indian numismatist, chronology is Mr. Vincent Smith's *forte*. In this respect, Mr. Vincent Smith's book is bound to prove a most valuable work of reference and should be regarded as a companion volume to Miss Duff's *Chronology of India*. He gives us a chronology (of course approximate) of the *Puranas*, of the *Saisunaga* and *Nanda*, dynasties, of the *Mauryas* of Pataliputra from 326. B. C. to 184 B.C., of the *Bunga*, *Kanva* and *Andhra* dynasties, of the *Kushans* and the *Guptus* and of the principal events of the seventh century A.D., besides a complete chronology of the Indian campaign of Alexander the Great.

Mr. Vincent Smith throws a flood of light on the age of the great *Kanishka*, which has for a long time been the despair of orientalists- The northern Buddhists as well as the author of' *Rajatarangini* would place him some time between 57 B.C. and 78 A.D. Mr. Devadatta Ramkrishna Bhandarkar places him at 278 A.D., on the]strength of a Well-known *Kushana* stone-inscription. In this view of the matter Mr. Deva" data has the strenous support of his father, Dr. Bhandarkar. But the Bhandarkars seem however to be singular in maintaining this view. Mr. Vincent Smith accepts *circa* 125 A.D. as the. date of the accession of *Kanishka*, which is a very important landmark in the chronology of ancient India. Mr. Vincent Smith displays no inconsiderable erudition. and ingenuity in his attempt to fix upon the dates of Patanjali and Kalidasa, the former. of whom he places about 150-140 B.C. and the latter about the close of the 4th century A.D. The age of Kalidasa has been a subject of endless controversy from the days of Weber and MaxMuller and sufficient materials have now been accumulated by the researches of Professor Macdonell and Mr. Manmohan Chakrararty to enable us to arrive at a finality on this point. If Mr. Chakravarty's date, the latter half of the 5th century A.D., be accepted as the correct one, a most knotty problem of Indian chronology will have been settled for good.

It is somewhat of a relief to find that Mr. Smith has, after all, been able, to shake off to a large extent his bias of hellenic influence on the civilisation and architecture of ancient India. India has not been hellenised and has remained unaffected by the Maccedonian storm, says Mr. Smith in his present work, though so late as in 1892 he was found to observe that "Indian medicine also appears not to have been uninfluenced by Greek." As I have discussed this subject at length in my *History of Hindu Chemistry* and proved, at least to my satisfaction, that Hindu medicine or chemistry owed nothing to Greek influence, I shall not go-over that ground again.

Mr. Vincent Smith, however, still clings to tk cherished belief that the Hindu Drama, at least, owes much of its inspiration to Greek [influence. We have been under the impression that the question had been, finally settled by M. Sylvain Levi in his *Theatre Indien* on the strength of bis own researches and of those of M. Pischel. M. Levi's view of the absence of any Greek influence on the Hindu drama is corroborated by Mr. Macdonell of Oxford in his *History of Sanskrit Literature* in the following Words:—

While the Indian drama shows some affinities with Greek comedy, it affords more striking points of resemblance to the' productions of the Elizabethan play-wrighta, and in. particular-of Shakespeare. The aim of the Indian dramatists is not to portray types of character, but individual persons ; nor do they observe the rule of unity of time or place. . . . The character of the *Viduaaka*, too, is a close parallel to the fool in Shakespeare. Common to both are also several contrivances intended to further the action of the drama, such as the writing of letters, the introduction of a play within a play, the restoration of the dead to life, and the uae of intoxicants on the stage as a humourous device. Such a series of coincidences, in a case, where influence or borrowing ia absolutely out of the question, is an instructive instance of how similar developments, can arise independently.

"M. Pischel, qua ost peutetre, entre les orieataliates de 1'Occident, le plus familier avec la rhetorique et la poesie dra-matique de 1'Inda, a juge brievement cette opinion. S'imaginer, dit-il, que le theatre grec ait eierce une certaine influence sur la formation du theatre indien, c'est temoigner une egale-ignorance du theatre grec et du theatre indien." *(Theatre-Indien,* pp. 343-344).

From the standpoint of Weber and Windisch one would be far more justified in drawing the inference that Shakespeare was considerably indebted to the Hindu drama, specially to-Kalidas.

To the accepted Anglo-Indian creed of considering India as a congeries of countries and peoples, Mr. Vincent Smith apparently does not subscribe. For, says he, "India, encircled as she is by seas and mountains, is indisputably a geographical unit, and as such is rightly designated by"one name. Her type of civi-Jisation, too, has many features which differentiate it from that of all other regions of the world, while they are common to the whole country, or rather continent, in a degree sufficient to justify its treatment as *a.* unit in the history of human, social and intellectual development."

Mr. Vincent Smith's book is embellished with some illustrations and maps, the most interesting of which are the one of India in the 5th, and the other of the Empire of Harsha in the. 7th. century A,D. The map of the Empire of Asoka (250 B.C.) is not half so interesting or informing as that given in Hartley's Asoka. A full and comprehensive index adds materially to the usefulness of this *History.*

In conclusion, one cannot help regretting that a very good book has been spoilt and a splendid opportunity thrown away by Mr. Vincent Smith's attempt to replace the real history of the Indian people or of the country itself by an ' accurate chronological presentation of dynastic facts ' and a faithful account of .a military progress. Dynastic facts or the brilliance of military exploits are no longer considered by any modern historian as the basis of history, and, in his anxiety to supply materials for the above, Mr. Vincent Smith has partially, we will not say totally, neglected to present to his readers a connected narrative of the development and growth of the Indian people as well as of the varied and interesting phases of Indian civilisation.

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* Essays and discourses–Dr. Prafullachandra Ray (1918), pp 319-331.

British India

"Speak of me as I am, nothing extenuate,
Nor set down ought in malice."—Othello.

The following review of "The Expansion of British India" was contributed by Dr. Ray to the "Indian Review" Madras, for December, 1918 :—

Indian history labours under a serious dis-advantage. The Hindus with philosophic indifference have not thought it worth while to concern themselves with mundane affairs. Victor Cousin has very aptly remarked that a nation which has produced a *Gita* cannot be expected to take an interest in history "which" to quote the words of the immortal historian of the Roman Empire—"is indeed little more than a register of crimes, follies, and misfortunes of mankind." From the time of Mahabharata downwards to the pre-Mohammadan era we have occasional glimpes of the invasion of India by the *Mlechchas,* Yavanas, andSakas and Hunas, etc., but such references are so very casual and vague that it is hopeless to piece together anything like a connected narrative.[1]

We have no doubt of the "History of India as told by its own historians "; but the Mussulman conquerors "With their fanatical zeal for the spread of Islamism and in their flush of success had only scorn and contempt for the " infidels " and what they Write has to be taken with a grain of salt. Indeed, Sir H. Elliot 'who collected his materials from these chronicles admits that they are "for the most dull, prejudiced, ignorant and superficial."[2]

When we come upon the period of. British Rule in India we are on safe grounds. But here a fresh difficulty arises. It is all along the picture of the lion painted by himself. What Herbert Spencer calls "the bias of patriotism "comes into play and often Warps the judgments of the historians. "Ourcountry Tight or wrong," is a sentiment which not unfrequently vitiates their conclusions, as will be shown in these pages. Of late there is noticeable unfortunately a lamentable tendency on the part of certain English writers of Indian history, an attempt at whitewashing every dark or questionable episode and the result is that the press is being flooded not with sober history properly so-called but rather with their travesties.

It is on these grounds that we welcome the volume under review.[3] The authors very pertinently observe in the preface that "the study of Indian history in Indian schools and universities has been degraded by the use or rather abuse of, text-books"— because of the tendency, we fancy, to pass or gloss over debatable transactions. The period covered by the book, namely, 1818-1858 is perhaps the most eventful from the point of view of the "Expansion of British India," embracing as it does the era of annexation of Lord Dalhousie. The policy or rather the impolicy of annexation has been discussed threadbare, but in no other Indian question has partisanship been so important a factor. "Give a man of talents" says Emerson, "a story to tell and his partiality will presently appear. He has certain observation, opinions, topics, which have some accidental prominence, and which he disposes all to exhibit. He crams this part and starves the other part, consulting not the fitness of the thing, but his fitness and strength." Our authors have with commendable impartiality of judgment placed the views of both the schools in juxtaposition, leaving the reader to draw his own conclusions. They have been singularly felicitous in the plan they have adopted. The *dramatis psrsonts* have been brought upon the stage and they are allowed to 'tell their own tales in the shape of minutes, despatches to the Court of Directors etc. We are thus supplied with first-hand information at every stage—the authors simply confining themselves to the taks of summing up the conclusions. The First Afghan war and its genesis should arrest our attention for a while. "The crisis occurred," say our authors, "when the caution and experience of Metcalfe wer replaced in 1836 by the ignorance of Lord Auckland, the new Governor-General. At that time the Whig Government of Lord Melbourne was in power in England, and its foreign policy was dominated by Lord Palmerston who considered it necessary to counteract the progress of Russian influence in Central Asia. It is probable, therefore, that Lord Auckland arrived in India with a foreign policy already prepared by his political chief, who was alarmed somewhat naturally by the march of the Persians to

Herat in 1837. Lord Ellenborough in his memorable proclamation, dated Simla, Oct, 1, 1842 reversed the policy of Lord Auckland and released from capitivity Dost Muhammad Khan, "whom we had spent fifteen millions sterling of the revenues of India to dethrone without a cause."[4] History repeats itself. The last Afghan War was also of England's own seeking. On this occason Lord Lytton played the part of Lord Auckland and Lord Salisbury of Lord Palmerston. Sher Ali wanted to live in peace and amity with the British government and never dreamt of being an aggressor but he was supposed to be intriguing with Russia for this purpose. The War cost India somewhere near twenty millions sterling. The iniquity of saddling India with the burden of a war undertaken for imperial purposes was one of the chief plansk in the Midlothian Campaign of Mr. Gladstone and when he returned to power he tried to redeem his pledge. The Cabinet of which he was the head could not, however, be prevailed upon to repay more than five millions sterling and even what it gave with one hand it paractically took away with the other, for a large proportion of the expenses incurred for the Egyptian war was charged upon the revenues of India.[5]

The policy of annexation of Lord Dalhousie, which is largely responsible for a vast expansion of British India and also for the Indian Mutiny naturally occupies a prominent place in the present volume.

When a map of India was spread before Ranjit Singh with the British possessions marked red, he exclaimed : *"Sab lal ho yaega"* (every portion will become red). The fulfilment of this prophecy was not long in coming. It should be remembered that there were two schools of Anglo-Indian administrations, one of which represented by such men as Sir Henry Lawrence, Colonel Sleeman and Sir James Outram was strongly opposed to the policy of Dalhousie. Sleeman sounded the note of warning in no uncertain voice. "I consider their [the annexationist'S] doctrines" exclaims he "to be prejudicial to the stability of our rule in India and to the welfare of the people, which depends upon it." As for Henry Lawrence it is enongh to say that the devotion and persistency with which he espoused the cause of the doomed or fallen chiefs almost border upon chivalry. When Lord Dalhousie wrote to him 'suggesting that a proclamation be issued announcing the virtual absorption of the Punjab into the British possessions, he replied with his characteristic candour and boldness: "My own opinion... ...is against annexation. I did think it unjust, I now think it impolitic." Within the limited space at our disposal it is not possible to deal adequatejy with every individual state, *e.g*, Nagpur, Satara, Jhansi, etc. We shall con fine our attention to the case of Oude. At the outset it is necessary to remember that the oppression and misgovernment which prevailed in some of the feudatory states, and notably in Oude was the direct outcome of the system which had been imposed upon them by the British Government. James Mill in his evidence before the Select Committee of the House of Commons in 1832 observes :

"In the ordinary state of things in India the princes stood in awe of their subjects. Insurrenction against oppression was the general practice of the country.

The princes knew that when misgovernment or oppression went to a certain extent there would be revolt, and that they would stand a change of being tumbled from their thrones, and a successful leader of the insurgents put in their place. That check is, by our interference, totally taken away; for the people know that any attempt of theirs would be utterly unavailing against our irreeistable power; accordingly no such thought-occurs to them, and they submit to every degree of oppression that befalls them."

Lord Hardinge also in a despatch, dated December 21, 1846, expresses "his reluctance on general principles, to revert to the subsidiary system of using British troops to support a Native Government while we have no means of correcting the abuses of a civil administration of a country ostensibly under British protection. A British force, acting as the instrument of a corrupt native agency, is a system leading to mischievous consequences, and which ought, when it is possible, to be avoided."

It so happens that the present writer, while a student at Edinburgh, now one-third of a century ago, felt tempted to study some of the burning Indian questions with special reference to the annexation policy of Lord Dalhousie and it- is curious to find that the materials he had at his disposal are almost exactly the same as madevUse of by our authors, and the conclusions also identical. No apology is, therefore, needed for reproducing here a few excerpts from chapter iv of the little book, entitled "Lord Dalhousie an Annexationist."[6]

THE ERA OF ANNEXATION.

"And I beseech you Wrest once the law to your authority."—
shakespeare.

"The narrative of annexations will have seemed sometimes, doubtless, more like counting out the spoils of 'brigands in a wood, than detailing the acts of English statesmanship in the light of history."—EDWIN ARNOLD.

" What the Koh-i-noor is among diamonds, India is amojig nations. No Indian prince should exist."—SIR C. NAPIER ("Life," iv.,188).

"The two hundred and fifty kinglings must inevitably and .speedily disappear."—THE -'FRIEND OF INDIA." "Musty old parchments."—IBID.

No question has given rise to so many controversies as that of Oude. Fortunately, the materials at our disposal are abundant. We have here the testimonies of independent and non-official authorities, who are entitled to our highest respect. We must apologise for treating this matter in rather disproportionate detail; but we shall, however, take this opportunity of incidentally making some observations on the nature of out paat dealings with native princes in general.

"What is Truth, said jesting Pilate, and would not stay for an answer."

Those with whom rested the final decision of the fate of Oude do not seem to have been at particular pains to get at the bottom of the affair. Com-plaintsAbout the misgovernment of Oude have been brought to the notice of the Supreme Government since the beginning of this century. Grave as are the charges, deductions must be made for official colouring. Every one who has read Bishop Heber's Journals " must have noticed the keen discerning powers of the author, and the extreme care he took in collecting accurate information. This eminent divine bad no particular cause or party to vindicate. He saw nothing through a distorting medium; his vision was unimpeded by class prejudices. He resembled the great Continental poet and philosopher to whom all national jealousies and prejudices were quite foreign, and who saw in man the human being only." Hence Bishop Heber's observations on the condition of Oude must be regarded as valuable. " I was pleased, however, and surprised, *after all -which I had heard' of Oude,* to find the country so completely under the plough; since, were the oppression so great as is sometimes stated, I cannot think that we should witness so considerable a population, or so much industry." Bishop Heber was expressly cautioned against the lawless and ferocious character of the people of Oude; but his own experiences were quite of the opposite kind, for he was struck with " their *invariable civility and good-nature," and* he did not believe that "they were inflamed by any peculiar animosity against the English."[7]

That there were gross irregularities in the government 6f Oude it would be" idle to deny. But who. were primarily responsible for this state of thiogs ? A "grand policy," initiated by Warren Hastings, and carried into perfection by Lord Wellesley, quartered a "subsidiary army "on the resources of the- native princes. The consequence of this heavy drainage on their exchequer was to paralyse the machinery of their administration. With an ill-paid police, with revenue often in arrears, no wonder that extortion and rapine should follow in the train. As Bishop Heber justly observes: "They (the King of Oude's statements) show strongly the perplexities and mischief arising from the subsidiary system, which for so many years seems to have been our favourite policy in India, and to which it must be owned a considerable part of our greatness is owing."[8]

It was, however, in more ways than one that we made the efficient administration of Oude an impossibility. Sadat Ali, King of Oude, had appointed a man of remarkable abilities and administrative genius as his prime minister. In an incredibly short space of time he introduced several reforms, and Oude began to assume an appearance of prosperity. Here we must say a word or two about a peculiar personage with whom it is the lot of the readers of Indian history to cultivate acquaintance—the " Resident " or " Political." Whenever we find anything has gone abnormally wrong in our dealings with the native princes, we may almost be sure the Resident is at the bottom of it. This was pointed out long ago by the Duke of Wellingtont It is true, Elphinstone,' Malcolm and Metcalfe won their laurels as " Politicals," and have left honourable traditions behind. Unfortunately, these are not the only names in the pantheon of Anglo-Indian Politicals. Dismissed ministers and disaffected subjects of the native princes have often found indirect encouragement from our Residents. A weak-minded ruler and a pliant and unscrupulous minister are what ha,ve been most agreeable to the jealous and haughty temper of these mischief-makers. It is a mere truism that an honest and conscientious man cannot serve at the same time two masters of entirely different temperaments. Thus it was that the able and virtuous minister of the King of Oude was now sacrificed. Marshman has, in his own inimitable style, given us a short but' graphic account of Hakim Mehdi,[9] but he, has drawn a veil over the most important part. Bishop Hebert[10] and Prof. H. H. Wilson have, however, supplied the missing information, and thus we get a connected narrative of the whole story.[11]

Our dealings with the rulers of Oude have been always characterised by that strange admixture *oi* cunning, shrewdness and duplicity, which would ever form one of the darkest chapters in the history of India. When Warren Hastings wanted money he let out on hire the Company's battalions to conquer and exterminate the brave Rohillas, and have their land added to the province of Oude. When the Nepal war emptied the treasury at Calcutta, Lord Hastings was glad to obtain a loan of half-a-million from the Vizier of Oude, in consideration of which the territories torn from Nepaul were conferred upon the latter, as also the proud title of "King." This last act had also a political significance—that of lowering the prestige of theidescendant of the Great Moghul. Thus, while we were under obligations to the rulers of Oude, all our rsympathy for the down-trodden millions of Oude evaporated.[12]

It was Colonel Sleeman who, in a formal manner, brought to the notice of Lord Dalhousie's Government the miserable condition of the Oude peasantry. Slee-man, like Low and Henry Lawrence, was always a chivalrous upholder of native dynasties; but in this case he was the "missionary of a foregone conclusion." But SJeeman never for a moment recommended the seizure of the revenues of Oude. He, in fact, held the views of Heory Lawrence, who said : "Let the administration of the country be, so far as possible, native. *Lei not a rupee come into the Company's coffers.*" Mr. Herbert Merivale after carefully going over what both sides have to say, arrives at an opinion which is substantially the same as that recorded by Heber nearly thirty years before the "mission" of Sleeman. " Common justice will, therefore, compel us, who have no special cause to defend with the energy with which sides are generally taken in Indian politics, to own that Oude, when we annexed it, was a wealthy, populous, commercial region," which might fairly hold a comparison in tbege respects with many portion of our adjacent empire. Misgoverned it had been, and disgracefully, but not to the extent which really conies home to the mass of the population and paralyses industry."[13] Upon the whole we are inclined to think that the annexation of Oude was the result of that insatiable "earth-hunger" with which we had then been seized,[13(1)] veiled though it was under the specious pretext of conferring the "inestimable blessing" of British rule upon the wretched victims of tyranny.[14]

Even the French writer of this period seems to have been infected with the then prevalent craze Lanoye speaks of the annexation of Oude as one of the "crowning acts" of Dalhousie's administration, and observes that we were not bound to abide by treaty obligations with a people among jwhom there had been no Grotius or Puffendorf. The French writer evidently forgets or ignores that, long- before. Minos, Lycurgus and Solon, Justin and Grotius, had given laws to the European nations, Manu had laid down the fundamental principles of jurisprudence in no vague terms, which still hold the Hindu mind spell-bound. Indeed, our conscience had been so much steeled to wrong-doing as regards our dealings with the native princes that we did not see the frequent violations of plighted faith in their true light and not until the terrible catastrophe overtook us did we rid ourselves of the notion that the "downtrodden " peasant awaited with anxiety our happy advent. It was forgotten that, whenever we had annexed any territory, there was always at our back the glistening bayonet to enforce our monstrous pre-tentions; that the awe-struck and dumbfounded people made a virtue of necessity. Passive acquiescence was thus confounded with direct approval.[15] It is probable that a mutiny would have broken out in the Bengal Sepoy regiment even if there had been no annexations; but certain it is that it could have been *localised* (as in the case of theVellore mutiny), and thus nipped in the bud. It was in some of the newly annexed provinces e.g., Oude and Jhansi, that the masses made common cause with the mutineers, or, in other Words, the mutiny assumed the gigantic proiportions of a *relellion.*[16]

If is only necessary to supplement the account given above with a few more extracts from the Hon. F. J. Shore's " Notes on Indian affairs " quoted by our authors. (pp. 94-96).

"The motives of the Court [of Directors] in issuing such orders [for annexation] are obvious enough—gain.........But in Oude, the people have one great resource, of which they have been deprived, in a great degree, in our territories. Not having been cursed with "first-rate collectors," who' would ruin a district to procure a good name and promotion for themselves, or withryotwari systems^ by which almost all the middling and unper ranks of society have been reduced to poverty to increase the Government rent-roll, there is still in Oude a pretty numerous middle class of land holders to whom the people look up with hereditary respect, and who are of the greatest use in settling claims and disputes, so that but a small portion are re—referred to the amita in the towns also, the merchants are very much in the habit of resorting to arbitration." A.gain: "The English Government are mainly to blame for this state of things. How is it possible that native princes who are kept in a state of pupilage, and almost treated like schoolboys and should have-any self-respect or proper independence of feelling? This has been the case with Oudh, for the laat forty-years. Had the British Government turned their supremacy to good account, by insisting on the education of the native chiefs, so as to qualify them for the art of Government, this would have been a measure entitled to the highest praise ; but ao far from it, the' interference of the residents has been almost always exerted for evil; mdeed, so extremely difficult is it to discover the slightest benefit arising to any clasa of people from the establishment of residents at the native courts that there ia even ground for supposition that the measure has been adopted and maintained for the express purpose of promoting mis-Government and confusion in the different principalities, so as to afford plausible-eicuaes and opportunity for our taking possession of them."

The author of the annexation policy on the eve of his retiring from the stewardship of India' takes credit of being instrumental by means of the several territorial acquisitions in adding to the annual income of the Indian Empire four millions[17] sterling—the pfovince of Oude alone contributing close upon one and a half million. How a province which has been subjected to the perpetual annual drain of such a vast amount could afford to be prosperous is beyond our comprehension. Possibly our authors in the third volume of the series, namely, the "Economic Policy of the Company" will have to say something and we should :not anticipate their verdict.

Before we conclude we may be permitted to point out to our authors that they would have much more readily helped to explain the problem of the expansion of British India, if they had put in some extracts from Professor Seeley's philosophic treatment of ths subject in his admirable "Expansion .of England." The following passages are highly illuminating.

" In the early battles of the company by which its power was decisively established, at the seige of Arcot, at Plassey, at Buiar, there seems almost ways to have been'more sepoys than Europeans on the side of the Company, And let us observe further that we do not hear of the sepoys as fighting ill, or of the English as bearing the whole brunt of the conflict. No one who has remarked the childish eagerness with which historians indulge their national vanity will be surprised to rind that our English writers in describing, these'battles'seem unable to discern the sepoys. Read Macaulay's'Essay on. Olive; everywhere it is the 'imperial people,' 'the mighty, "children of the sea,' 'none could resist Clive and his Englishmen.' But if once it is admitted that the sepoys alwaysout numbered tBe English, and that they kept pace with the English in efficiency as soldiers, the whole theory which attributes wu'r Success to an immeasurable natural superiority in valour fa'lls to ground. la those battles in which our troops were to the enemy *as* one to ten, it will appear that-if we'-may say that one Englishman showed himself equal to ten natives, we may also say that one sepoy did the same. It follows that, though no doubt there was a difference it was not so much a difference of race as a difference of discipline, of military science, and also no doubt in many cases a difference of leadership.

'Observe that Mill's summary explanation of the conquest of India says nothing of any natural superiority onthe part of the English. 'The two important discoveries for conquering India were; 1st the weakness of the native armies against European discipline 2ndly, the facility of imparting that discipline to natives in the European service. He adds : 'Both discoveries wer made by the French.'

"And even if we should admit that the English fought better than the sepoys and took more than their share in these achievements which both performed in common, it remains entirely incorrect to speak of the Engish nation as having conquered the nations of India. The nations of India have been conqured by an army of which on the average about a fifth part was English. But we not only exaggerate our own share in the achievement; we at the same time entirey misconceive and misdescribe the achievement itself. For, from what race were the other four-fifths of the army drawn? From the natives of India themselves! India can hardly be said to have been conquered al all by foreigners, she has nothing conquered herself....

"The fundamental fact then is that India had no real only of the foreigner because India had no sense whatever of national units, because ther *was* no India and therefore properly speaking, no foreigner."

Foot Notes :

1. "The Yavana besieged [Arunat] Saketa"

" The Yavana besieged [arunat] Madhyamikas. The above extracts from Patanjali's commentary on Fanini have been, adduced as proof of the invasion of India by the Greek king Menander about 155 B.C.—Indian Antiquary, 1872, p. 299.

2. One or two extracts may be given here to, make this point clear. "So Qod granted the Sultan the Victory of Nardin such as added, to the decoration of the mantle of Islam."—Elliot, ii, 39; again: "The Almighty desired to grant a support to the power of Islam and to the strength of the, Muhammadan faith, to extend his glorious shadow over it, and, to preserve Hindustan within the range of Ms favour and protection; *ibid;* 360.
3. The Expansion of British India, 1818—1858 by G- Ander-son, M.A., Professor of History, Elphinstone College, Bombay and M. Subedar, B.A, B.SC., F.R.S.S., Professor of Political Economy of the University of Calcutta..
4. With regard to this question the spirited protest of Mr. Bright from his place in Parliament (1858) may not be out of place here. " Last year I referred to the expense of the AfghanWar—about £15,000,000—*the whole of which ought* to *have been thrown on the taxation of the people of England,* it was a was commanded by the English Cabinet for objects, supposed to be English."
5. In spite, we believe, of the protest of Lord Ripon.
6. *India before and after the Mutiny.* By an Indian Student : Edinburgh: E & S, Livingstone, 1886.
7. Heber's " Journal" (1846), vol. L, p. 210.

   Cf.—"In the number of cattle, horses, and goods which they possess, and in the appearance of their houses and clothes, the people (of Oude) are in no joints worse (in many, better off) than our own subjects. The wealth of Lucknow—not merely or those in authority, but the prosperity or the bankers and shopkeepers—is far superior to that of any city (Calcutta perhaps excepted) in the British dominions. How can all this be the case, if the Government is notorious for tyranny and oppression?"—(" Notes on Indian Affairs," vol. i., p. 156, by Hon. F. I. Shore.)
8. Sir T. Mufiro, speaking in 1817 of the subsidiary system, observes that it must "destroy every government which it undertakes to protect."—("Life," vol. i., p. 464.)

   " In our treaties we recognised them—the native princes—as independent Sovereigns. Then we sent Residents to their courts. Instead of acting in the character of Ambassadors, they assumed the functions of dictators, interfered in all private concerns, countenanced refractory subjects against them, and made the most ostentatious exhibitions of their exercise of authority."

9. "This extraordinary man—Hakim Mehdi—was the son of a Persian gentleman of Shiraz, who emigrated to India in search of political employment, and entered the service of Oude, in which he rapidly rose to distinction. He was one of the ministers who, in 1801, vigorously, but ineffectually, opposed the cession of territory demanded by Lord Wellesley. He identified the prosperity of his adopted country with his own happiness, and devoted his splendid talents to the improvement of the administration. It was gracefully remarked of him, that the 'poorest man never entered his house without a welcome, or departed without relief. . . . Lord Wm. Bentinck pronounced him one of the ablest men in India, and as a revenue administrator unsurpassed by any officer, European or native." History," vol. iii. p. 26.
10. "His—King of Oude's—minister at the time of his death as Hakim Mehdi. A man of very considerable talents . . . and to the full as honest and respectable in his public and private character as an Easter Yiziem can usually be expected to be. The new sovereign was said not to be very fond of him, out there seemed to be not the least inclination of removing him till his power was undermined, most unfortunately for all parties, *by the British themselves."—HEBER's* "Journals," vol. ii., p. 221.
11. "The Resident (Mr. Haddock) opposed, his (Hakim Medhi's) elevation under the impression that Hakim Medhi was decidedly inimical to British rule. But the Government, anticipating important benefits from his acknowledged abilities, concurred in his nomination. His restoration to power was followed by measures of a beneficial tendency." The Resident however, remained surly, and reported that the state of Oude "had reached so incurable a stage of decline, that nothing but the assumption of tbe adminisgfation for a time could preserve it from utter ruin."—WILSOH's continuation of Mill's History.
12. Mr. Bright, reviewing the whole transactions of the British Government with the rulers of Oude since the days of Warren, Hastings, estimates that £31,500,000 had been extorted from them under various pretexts (1858).—" Speeches of John. Bright." Edited by THOBOLD EOGEES, vol. i., p. 70.

13. "Life of Sir Henry Lawrence," vol. ii., p. 288.
The condition of Oude appears now to be worse. " They (the-masses) are often underfed, generally underclothed, and have not, as a rule, anything that they can call their own" (1880) — H. C. IHWIN ; " The Garden of India," p. 307.

13.(1) The above was written nearly three months before the annexation of Burmah.

14. Mr. Edwin Arnold has approvingly quoted Lanoye in support of the annexation of Oude. But a countryman of Lanoye's, who, throughout his work, expresses his admiration for British role thus records his candid opinion: "Il est peu de villes de I'Inde dont le prémier aspect charme plus 1'entrager que Luck-now, et 1 on cdmprend avec quelle convirtise les Anglais ont du longtempscontempler cette perle des cites de I'Hindoustan, jusqu' au jous ou sur nn futile pretexte ils reussirent a s'en.' emparer.'-ROTTSSELET: "L'lnde des Rajas," p 679.
Mr. Irwin alsp takes the above view.
"L'Inde Contemporaine."—Edition of 1858, p. 287.

15. The precious lesson contained in the following dialogue was lost upon us in the moment of infatuation: " Miserable as we are, of all miseries keep us from that (annexation)!" " Why so?" said Captain Lockitt, "are not our people far better governed ? " " Yes; but the name of Oude and the honour of our .nation would be at an end."—Heber's "Journal," vol. i., p. 225.

16. *Cf.*—That the Sepoys believed that the greased cartridges "were destined to deprive them of their caste, is, I think, not to *'be* questioned. *But they believed that calumny because the actibn of'the British with respect to their, own province (i.e., Oude) had so shattered their faith in the professions of their ruling power, that they were ready to credit anything agdinst'it.* . . . In a greater degree, the annexation of Oude and the measures which followed that annexation: in a lesser degree, the actual employment of animal fat, . . . constituted ample grounds for the distrust evinced by the Sepoys."—CoL Malleson's continuation of Zaye's " Sepoy War," vol. L, pp. 351-2.

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* Essays & Discources–P. C. Ray (1918) pp. 332-349.

Medical Education and Research Sacrificed at the Altar of Vested Interest*

The I.C.S. and the I.M.S. are known as the covenanted services, as the members thereof after passing the competitive examination in London enter into a covenant with the Indian secretary, securing special privileges. It is rot necessary to recount here what difficulties have been placed all along in the path of the Indian candidates (see, pp).

The recruitment of the professor chairs in the several medical colleges of India being practically confined only to the I.M.S. men, has impeded research in medical subjects. The saying, is any stick is good enough to beat a dog with; so any member of the I.M.S. is competent to occupy any chair in a medical college. It thus happens that a man posted as a Civil Medical Officer in a district, or as a Surgeon in a regiment, gets a telegram one fine morning informing him that he has been appointed a Professor,say of Pathology in the Calcutta Medical College, and must join his new post at once. No matter his knowledge of the subject is such as he might have picked up while preparing for his degree, or "qualification" examination years ago, and what he managed to forget long ago. He may again have to occupy the chair of Chemistry in due course. Even now in the third decade of the twentieth century, while the world has been moving at a tremendous rate, and astounding discoveries are being made almost day by day, the wheels of the mechinery in India are clogged and refuse to move. That a Cunningham or a Ross, or a Rogers, stands to the credit of the service, is no justification for its raison detre. I should say that such men have been produced not because of the anachronism but inspite of it. Let some competent authorities now speak for themselves.

While Ross in 1897 was busy at Secunderabad with his self-imposed task of examining the Culex fatigans as a possible carrier of malarial germs, he was staggered with the following order :–

"Under instructions from Command Headquarters, Surgeon-Major

R. Ross, I.M.S., will proceed immediately to Bombay for military duty."

Por Ross was simply taken aback by this bolt from the blue, as he himself says, "It was not my turn to go, but that of my racing friend, who was now traininghorses at Secunderabad; * * * No sooner had I found the Treasure Island, than I was driven away from it by an unopposable gale. I saw the Promised Land, but was not allowed to enter it. Owing to no fault of mine, two long years were to elapse before I was to see again–in another continent–that wonderful revelation of human malaria in mosquitoes. During that time all my work was to be pirated by foreigners, and the same "maladministration which now drove just when my discovery might have been of real help to her swarming and dying millions" * * Memories: p. 239. * * * "A Madras man sid to me, "We I.M.S. men are not meant for research and so on–we are simply doctors". There is a certain feeling against not only research, but men whose names are seen in print". Ibid: p. 243.

Sir Nil Ratan Sircar in the course of his evidence (1924) before the Royal Commission on the Superior Indian Civil Services observes: The price that India has to pay for appointing I.M.S. officers as Civil Medical Servants, particularly as teachers, must not be computed in terms of money along. It proves too heavy not only because of our limited resources but also because of the cramping effect that the present system produces on the Indian Mind. The system has systematically deprived Indians of opportunities of higher research and higher training and the great benefit of first-hand experience by keeping the higher posts-educational, research and clinical-almost as a close preserve for a practically foreign class. The whole atmosphere is humiliating to Indians. A system that seeks to train the flower of our youth merely as assistants and subordinates (the very natural idea of being succeeded in his chair by one of his pupils being unthinkable to the average I.M.S. professor) cannot certainly be appreciated as an ideal system.

Again, as Chairman of the All India Medical Conference, 1928, in the course of his address, he says :

The same spirit of unpardonable official non-co-operation is in evidence when the question turns on organising medical and sanitary research under the responsible direction of Indian officers, and yet the Indian is nowise wanting in capacity for such work; witness the remarkable results achieved by many Indians working under great difficulty and also by the purely Indian installations of scientific research like the Bose Institute, and the Science College instituted by the late Taraknath Palit and Rashbehary Ghose of loving memory, in the Calcutta Unveristy, both for training men and investigating scientific facts and phenomena. Nothing is more demoralising than a situation in which the natural master and servant change their places,–even the Biblical parable knows nothing of this species of the "unprofitable stewards."

It is futile to expect a vigorous growth of the faculty of scientific research under the cold shade of alien authority that has only a sneer of indifference, if not of jealousy, for genuine merit in the aspiring subordinate. The natural apprehension seems to be that a meritorious Indian in subordinate capacity if encouraged, may raise his head too high by perseverence and devotion to scientific work.

But vested interests are opposing tooth and nail any reform in this direction and for an ounce of concession they demand a ton of additional privilege. And often the privilege beings apace, though the concession, like wisdom lingers, and may even fail to appear, as in the case of some chairs in a Medical College which were promised liberation from the grip of the Military Service.

The eminent Bombay surgeon, Dr. G. V. Deshmukh as President of the above conference eqully lays stress upon the handicap under which the Indian labours :

"No Research has ever been produced in an atmosphere of redtapism, status, and dignity and as such the idea of always reserving the majority of posts for I.M.S. men is a very pernicious one. Research by men in the I.M.S. is an accident and the pure atmosphere of research should not be polluted by any admistrative considerations.

"Even in a city like Bombay, it is not unknown that a gentleman with practically no experience of Midwifery and Gynaecology was appointed to the Post in these subjects in a teaching Institution."

Equally emphatic are the eloquent testimonies of Dr. Bidhan Chandra Roy as also of Colonel Bhola Nath as President and Chairman respectively of the All India Medical Conference, 1929 :

"Most of us have been trained n the Allopathic system. Let us frankly admit that our teachers have not given us that broad outlook, that deep insight into the medical lore which every teacher ought to inculcate in his pupil. Why do I say that? There is a simple test. No professor belonging to the Medical Services, has ever to my knowledge, trained an Indian student in such a way that he may prove capable in time, of occupying the chair of his teacher. It has all along been a process of safeguarding the interests of a trade union. In order to reserve the posts for the Services, it has happened, that the very same professor has taught subjects like hygiene, chemistry, physiology, surgery, opthalmic surgery in different periods of his service in India. We cannot conceive of a more monstrous method of imparting medical education in any country. A complaint was made by some. I.M.S. Officers before the Public Services Commission that in India specialisation in any medical subject was unknown. Who is responsible for this? How can we expect anything else from those teachers who have developed only one form of speciality namely, the speciality of possessing an overweening self-confidence, the speciality of rejecting all claims of the Indian practitioners to fair treatment, the speciality in belittling everything Indian. The irony lies in the fact that while condemning the Indian practitioners the I.M.S. Officer forgets that he is condemning himself, that he is hoist with his own petard. (B. C. Roy).

The matter which was referred to a number of Committees and Commissions was neither the improvement of the indigenous profession nor the Indianisation of the service, but how best to placate the irate I.M.S. man. The pages of the reports of these commissions are a sad record of the tragic struggle between justice and iniquity, between faist play and vested interests. (Col. Bholanath).

Sir P. C. Roy's Essays and Discourses

BY PROFESSOR SATISCHANDRA MUKHERJEE, B.SC. M.A.

Messrs. Natesan must be congratulated on their publishing a series of lives and works of the great sons Indian and the book under review which is their latest contribution to the series adds fresh lustre to their reputation as this publication is quite unique of its kind being the essays and discourses of an Indian scientist. The world knows Sir Prafullachandra Ray as a great chemist, but the fact that he can wield a pen as powerfully as he can handle a test tube will be a revelation to those who will read this book. It shows an amount of edition, culture and beauty of style rare even among famous literary men of our centry.

Genius is generaly an one-sided development of the brain, but the outstanding feature of Sir Prafulla Chandra's genius is its versatility. Not only is it evident from the biographical sketch given at the beginning of the book but also from the eassyas on diverse subjects covering the fields of science, literautre, history, education, politics, economics and sociology, Any one of the three greatest achievements of his life,—namely his chemical discoveries, the starting of the Bengal Chemical and Pharmaceutical Works, and the writing of the History of Hindu Chemistry—would have been sufficient to make a man famous. And when along with these intellectual achievements we find a heart ready to sympathise with distress we get the picture of a man rare in these days.

Space does not permit me to do more main point out a few of the more interesting portions of the book. Sir Prafulla Chandra is pre-eminently a researcher and pioneer of Chemical researches in India and it is natural that some of the essays will be in connection with the progress of chemical researches in modern Bengal. It is well known that he is the founder of a new Indian school of chemists who are enthusiastically carrying on research work after imbibing inspiration from his example also upon 200 original contributions been madeby Dr. Ray and his pupils, a list of which was given elsewhere (These papers have already been published on 150th Yr. of completion of

C.U...... and the more in this series on science topres Editor). In these essays Sir Prafulla Chadra with his characteristic humility has kept his own work in the background (though we know that his discoveries have made him a chemist of world-wide reputation) and has given prominence to the work of his pupils. Indeed he frequently quotes the Sanskrit saying meaning that men should desire victory everywhere : but they should covet defeat at the hands of their pupils.

It is a noteworthy fact that Sir Prafulla Chandra has not confined his attentions to discoveries in theoretical chemistry alone but he has also started a chemical works known as the Bengal Chemical and Pharmaceutical works which is at present big enough to elicit high praise from all who have visited it including such great personalities as His Excellency Lord Ronaldshay. It is difficult to believe that this gigantic works was started many years before the Swadeshi movement by Sir Prafulla Chandra who was a poor illpaid junior professor at that time. Really Dr. Roy has right to be regarded as a Captain of industries and his observations on the commerce and industries of present day India (contained in the eassay on "Chemmical Industry in India," "Government and Indian Industries") are well worth listening to.

Sir Prafulla has all along been very fond of reading history. Indeed he has often been heard to say that his natural predilection lay for historical studies and that he became a chemist by mistake. It is to this taste taht we own his monumental History of Hindu Chemistry, in which he showed that long before the rise of Chemical knowledge in Europe, India made valuable Discoveries in chemistry—some of which were made known in Europe by the Arabs. This history will not allow us to lose heart regarding the future scientific culture in India—for the nation that has a past has also a future. Those who cannot afford to read the two big volumes of this History will do well to read the summary of this subject written in a lucid and interesting style in theessays onthe antiquity of Hindu Chemistry published in this volume.

But his interest in history is not limited to history of Science alone. His articles on Ancient India and British India are full of sagacious observations, fruits of his ripe scholarship. It is interesting to find that he has pointed out some mistake of Vincent Smith, the celebrated author of the History of Ancient India.

Sir Prafulla Chandra is an ardent social reformer. It pains him to find the apathetic manner in which educated hindus of the present day allow some baneful and unjut customs to eat into the heart of Hindu Soceity. As the President of the Indian National Social Conference, 1917, he eloquently pleadd the cause of the depressed classes of our country in the following words :–

"The backward clases are flesh of our flesh and bone of our bone and it is the bounden duty of our men of light and leading to extend to them the right hand of fellowshiop and lift them up from the quagmire of degradation and despondency. We cannot afford any longer to have in our social frame work a ..... minority of Spartaus lording it over .....

But his zeal for social reform does not make him oblivious of the importance of political reforms which too must advance side by side with the former. The memoris he has written of the eminent politicians like A. M. Bose, Dadabhai Naoroji and Sir William Wedderburn are evidences of his interest in Indian politics. In one of these he observes :—

"The ultimate moral justification of England's role over India is ot *Pax Britannica,* not even the economic prosperity of the country, but the preparation of the Indian people for self-government. If that end is lost sight of in the pursuit of any subsidiary advantages or improvement, British policy in India will miss its true goal; its history will be the records of a huge failure, a record of immense preparations without fruition."

Sir Prafulla Chandra's love for his mother tongue is responsible for his presidential addresss, delivered in Bengalee at the Second Bangalee Literary Conference and translated in the present book. Here he has strongly advised the publicationi of scientific books in the vernaculation of the country.

The most interesting and educative of all these essays, however, is the one on "The Bengalee Brain and its Misuse" The message for his countrymen contained in this essay is best expressed in his own language—

"The Swadeshi movement has brought home to the necessity of enmgaging in commercial pursuits starting industries. But our national asset in direction has been of a poor type. The Bengali never been taught to stand on iss own legs. Here a sorry figure when he encounters the rough tumblke of the life of a man of business... I have already pointed out that through sheer criminal falsly and negligence we allowed the internal and external trade of our country to slip out of our hands while our eyes remained fixed on the government service as on the pole-start, the enterprising up-country people and the Marwaris managed to capture our trade....The Bengali yough cannot do better than learn the first principles of business at the fear of those enterprising people [the Marwaris]."

In another place.—

"The Bengalees are inferior to none as far as the brain power is concerned but unfortunately his intellectual gifts have been misapplied. Hence the Bengalee's countribution to the world's stock of knowledge has been very meagre.... Under the exist *regime* a race of lawyers has sprung up, when are maintaining the traditions of old as the intellectual descendants of the products of the *tols* and display admirable forensic acumen. But the law at least can ofter carrers only to a limited few,– to an infnitesimal fraction of our educated youths. The Bengalees have practically degenerated into a recent quill-drivers. It is time we were roused from our torpor. Let the vast latent potentialities of his nation be roused to activity."

In conclusion, I do not doubt that not only those who seek inspiration from the biographies of great men but also these who care to think about the vital preblems of India of today will carefuly and thoughtfully read this volume from the begining to the end.

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* The Modern Review Feb, 1919, pp.171-172

The Review written by Prof. Satischandra Mukherjee, BSC., M.A. of the Book 'Essays & Discourses'–by Dr. P.C. Ray published by GA NATESAN & CO. Madras. (1918) appeared in the Mod3ern Review, Feb, 1919. is reprinted–Editor.)

* originally published in Bengalee under the heading of বাঙ্গালী মস্তিষ্ক ও তাহার অপব্যবহার।

The Task Ahead*

The ordinary banking institutions of the country carry on their business with the object of making profit; any assistance that they are able to give to their constituents generally goes to help those who are already in possession of the good things of life. Co-operative societies, however, follow a higher and nobler object They are primarily concerned with service; profit is not their main concern. Besides, what is more important, the cooperative movement aims to help the helpless and the indigent; and the vast mass of our people belong to this class.

It is true that the high hopes that the introduction of the co-operative movement in this country raised in the minds of its promoters have not been fully realised. But, if one takes the trouble to examine the figures relating to the working of co-operative societies in, say, one's own Province, or in India, as a whole, one will readily acknowledge that there is no other organisation or group of organisations, which serves so numerous a body of poor and helpless people or affords relief even to such an extent, however meagre it might be, as cooperative societies are able to do.

The co-operative movement in India as a whole had about Rs. 90 crores as its working capital in 1929-30. Its owned capital (share capital plus reserve) constituted 23.7% of this; loans and deposits from societies, including provincial and central banks, 36.8%. The total working capital of the movement in Bombay Presidency amounted to about 13 crores, the paid-up share capital Rs. 1,65,32,000, and loans and deposits held at the end of the year from members Rs. 2,73,92,000, from societies Rs. 66,26,000,from provincial and central banks Rs. 2,72,24,000, from Government Rs. 43,54,000, from reserve funds Rs. 93,80,000, and from non-members and other sources Rs. 3,66,31,000.

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* Address delivered on the occasion of opening of a co-operative society at Karachi.

Standing by themselves these appear to be an imposing array of figures. But along with this we find that while the average membership of each primary agricultural society in Bombay Presidency was 72, the percentage of population directly affected by the movement was only 13.3. The corresponding figures for the whole of India were 34 and 5.9. The average share capital per member of primary agricultural societies in Bombay Presidency amounted to Rs. 8.1, the working capital per member Rs. 119.3 and the average deposits per member at the end of the year Rs. 22.5.

The corresponding figures for the whole of India were Rs. 13.6, Rs. 112 and Rs. 5.8 respectively. Roughly speaking, in the whole of India we have over 6 lakh of villages with a little over a lakh of co-operative societies. This in other words means that barely one-sixth of the number of villages are served by the co-operative movement These figures show that the cooperative movement has not yet been able to touch more than the mere fringe of the area it aims to tackle.

The various enquiries that have recently been made into the working of the co-operative movement have disclosed certain serious defects. Among these some may be mentioned here, namely, accumulation of overdues from members and societies, want of adequate staff and funds, widespread illiteracy and lack of business experience, ignorance of co-operative principles among members and workers, and absence of co-operative education. If the co-operative movement is to be placed on a stable and sound basis these defects require to be remedied and all obstacles removed. The situation has been very much accentuated, as you are all aware, by the present long-continued economic depression. Finding the situation extremely arduous and perplexing the authorities have slowed down progress and begun to pursue a policy of extreme caution and circumspection.

It is however at the same time acknowledged that there is no more potent instrument for the amelioration of the condition of the people, a very large proportion of whom are impoverished and crushed by the over-whelming burden of debt, than a wider extension of the co-operative movement. “The co-operative movement, in spite of imperfections and of unavoidable setbacks, deserves," writes the foreign banking experts of the Indian Central Banking Enquiry Committee, "every possible assistance from all quarters, because there is no better instrument for raising the level of the agriculturist of this country than the co-operative effort and a strong appeal to the banking interests of the country to assist this movement seems not at all out of place." The Royal Commission on Indian Agriculture are equally insistent that no efforts should be spared by Goverment to promote the co-operative movement. "If the rural community is to be contented, happy and prosperous" they say, "local governments must regard the co-operative movement as deserving of all the encouragement which it lies within their power to give." They add : "It is now accepted that co-operative principles can be used in overcoming most of the obstacles to progress in rural communities. Wherever agriculture is the predominant industry, co-operation is coming to be regarded as the natural basis for economic, social and educational development, and India is no exceptioa Whatever view is taken of the failures and disappointments, it cannot be denied that, in almost all provinces, there are to be found outstanding examples of the successful application of co-operation to the problems of rural life; and, where success has been obtained, it should be within the power of the people to repeat it" The Commission go so far as to urge that as Government are directly interested in whatever contributes to the economic welfare of the rural population, their officers of all departments should, at all times, render such assistance to the promotion of the movement as the nature of their particular duties permits, and call upon Provincial governments to impress upon their officers the importance they themselves attach to an active interest in every phase of cooperative activity.

It is unfortunate that notwithstanding such ample recognition of the value of co-operation in the improvement of the economic condition of the rural population in India, many of the Provincial Governments have, from what I have been able to ascertain, already curtailed their expenditure on their co-operative activities, while others are contemplating measures in that direction. I desire to commend to the notice of the authorities the observation made by Mr. M. L. Darling in one of his reports. He said in the course of his Report for 1929-30 that he was convinced that co-operation was the most constructive and life-giving economic activity in his Province and that he considered the movement to be "of such importance to its future welfare that no financial stringency or economic depression, however serious, should be allowed to retard its development" The more successful and important among the co-operative societies and those among the general public who are anxious to promote the welfare of rural India have an obvious responsibility to fulfil at this juncture. They should exert their utmost to see that no steps are taken that are likely to retard the progress of the movement Many of the defects of the co-operative movement, as now disclosed, are due to the fact that the warning of the Maclagan CjMrimitteg_wjth reference to the need of co-operative education and training has not been properly heeded. The Committee strongly urged the necessity for careful teaching both before and after registration. "Most of the faults which we have found in societies," they said, "are due to the lack of such teaching, and the importance of the point can scarcely be exaggerated. The work of instruction is trying and uninteresting, and there is generally a tendency to scamp it Pamphlets and formal lectures are good in their way, but are of very secondary importance compared with actual personal instructions by the organizing or supervising staff in the villages themselves. District and Provincial Conferences are also valuable in stimulating interest and a healthy rivalry but do not afford the solid instruction that is required." They further pointed out that it was very advisable that all officers on the controlling staff should be capable of thoroughly mastering and digesting the standard books and periodicals on co-operation without relying on second-hand information with regard to European conditions, and laid stress on the necessity of a more thorough study by them of the theory and practice of co-operation in all parts of the world than it had been the case so far. There were so many cases in which the controlling staff had to decide on the course most consistent with co-operative principles, they said.

that it was most desirable that they should all be steeped in the literature of the subject, and should even if possible, have gained some personal experience of it in Europe. It is interesting to note the observations on the subject made by the Madras Committee on Co-operation who reported some time ago. They said:

"We have been much impressed by the lack of knowledge of even the common places of co-operation shown, not only by the members of the primary societies but also by officebearers, and even by the staff employed by the various non-official agencies. We believe that many of the unsatisfactory features in the present condition of the movement are directly attributable to this ignorance. Even the official staff is, we consider, in many respects insufficiently trained for the proper discharge of its duties. Too much importance cannot be attached to the necessity for adequate education in co-operative principles of all concerned in the movement."

The remarks quoted above illustrate to what extent the authorities in many of the Provinces have failed to fulfil their responsibility in the matter of co-operative education and training. It is unfortunate that excepting in one or two provinces the arrangements for co-operative education and training are still quite inadequate. Effective steps should be taken by Government in co-operation with co-operative societies in every Province to provide for such educationand training without which there is no hope of any real improvement and expansion of the movement

Further, it appears to me that systematic efforts should be made now for the promotion of co-operation in the non-credit sphere as also for organising, co-ordinating and strengthening co-operative activities on such lines as would lead to the transformation of the co-operative movement into a popular and national movement. The efforts that have so far been made for the promotion of non-credit co-operation have not been of an imposing character. But the results already achieved show that this side of the movement, if properly organised, has a very promising future.

The lot of the poor cultivator or of the indigent labour attached to rural industries cannot be improved simply by providing facilities for loan. He should above all be provided with proper opportunities for earning an additional income in his spare time. This object can be secured if public spirited and enthusiastic non-official workers possessing powers of initiative and inspired by a spirit of enterprise and service come forward and undertake this most important work If this work is organised in the right way and by proper persons it may be possible to utilise in the furtherance of it the services of a large number of educated young men who now find very inadequate outlet for their energies. If the co-operative movement is to be in a position to undertake bold schemes of reform and reconstruction, ampler and more adequate funds are needed. They should, however, for the present, make the best of the limited resources at their disposal. If they proceed with their work with steadfast devotion and persevering enthusiasm that would pave the way to better and more promising days.

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* Source : The Bengal Co-operative Journal:
No. 3 vol-XVm, January-March-1929

by Courtsey : Pinak Pani Dutta

National Council of Education, Bengal

Annual Report 1919–21 (page 3)

In July 1920 Mr. P. N. Bose was obliged to resign the office of Rector owing to use his own words, prolonged absence from Calcutta. The committee of their meeting held on the 26th July, 1920 placed on record their high appreciation of his valuable services to the council. After his resignation Sir Asutosh Chaudhuri, was good enough to act as Rector for about 9 months. Sir P. C. Roy was then appointed Rector of the council at its meeting held on the 19th March, 1921 and the committee whenever necessary have approached him for advice and guidance which he has rendered freely and ungrudgingly. At the opening of the last session of the Bengal Technical Institute in July. 1921, the present Rector delivered an inspiring address to the students, full of high aims, noble ideals and practical good sense.

Annual Report 1922 (page 1)

Sir P. C. Roy has since March, 1921 filled the office of Rector of the council. He takes a lively interest in the affairs of the council and his advice and help are at the disposal of the committee and the students whenever sought. He visited the Laboratories, Workshops and other departments from time to time and rendered valuable assistance.

Annual Report 1923 (page 1)

Sir P. C. Roy has since March, 1921 filled the office of Rector of the council. His interest in the affairs of the council has never flagged and his advice and assistance are always at the disposal of the council. In the year under report he delivered two inspiring addresses to the students and the teaching staff of the Bengal Technical Institute, which were greatly appreciated.

Annual Report 1924 (page 2)

On the election of Dr. Sir P. C. Roy, Kt as president of the council the office of the Rector which had therefore been filled by him was offered to and accepted by Mr. Mohini Mohan Chatterjee.

Annual Report 1926 (page 2)

Sir P. C. Roy and Mr Basanta Kumar Bose, M.A., B.L., were re-elected as president and vice-president respectively of the committee for the year under report. Sir P. C. Roy not only evinced a deep interest in the general affairs of the council and visited the Bengal Technical Institute whenever needed but he assisted the committee with his valuable suggestions and mature advice in connection with the teaching work in the Institute.

Annual Report 1936 (page 11-12)

The 31st celebration of the Foundation Day of the Council and the function of awarding diplomas & C. to the successful students of the College of Engineering & Technology, Bengal took place on the 5th April 1936, at the council's college compound at Jadavpur. Dr Sir P. C. Roy presided over the function.

Annual Report 1944 (page 1)

That this meeting of the National Council of Education places on record its deep sense of sorrow and irreparable loss at the passing away of Sir P. C. Roy who was the President of the Council for a long time. He was a sincere nationalist and took great interest in the spread of education in the country. He had early realised the important place of Science & Industry in the life of a nation and carried on a vigorous propaganda for their development in the country. His own contribution to one branch of Science is well-known and he succeeded in creating a spirit of scientific research amongst his pupils. In the industrial field he was the founder and promoter of many industrial concerns. His self-sacrifice, sympathy for the poor, straight forwardness of conduct and simple habits of life won the affection and regard of all classes of people. He will live in the grateful memory of his countrymen for his life-long, devoted service in the cause of the country.

Dr. Sir P.C. Roy Hony. Rector of the Council 1921-1924 (March)
President; 1924-1944

The records are available from the National Council of Education Bengal archieves. We are indebted to the council and particularly to Prof Anandadev Mukherjee, Secy. Council Editor

Recruitment of the Educational Service

The following is the text of the Memorandum on the-Recruitment of the Educational Service presented to the Islington Commission by P. C. Ray of the Bengal Provincial Educational Service:—

I have expressed my views in my corporate capacity on the undesirableness of ear-marking a branch of the Educational Service as ' Provincial.' In the present memorandum I shall confine myself to one or two points in connection with the method of recruitment of the service and the disadvantages under which its members have to labour.

In the Despatch of the Secretary of State for India on the " Reorganisation of the Educational Service of India "1896, occurs the pronouncement: " In future natives of India who are desirous of entering the education department will usually be appointed in India and to the Provincial Service. "This momentous and unfortunate decision has had the effect of virtually excluding Indians from the higher or the Imperial branch of the service. In-reply to a question put in the Imperial Council last year the Hon'ble Mr. Butler replied that out of 211 appointments in the Imperial branch only 3 were held by natives of India.

The present system stifles the legitimate aspirations of our countrymen and keeps away the most meritorious amongst them from the fold of the education department. The hardships of the " Provincial Service " members can best be brought home to the Commission by referring to some concrete instances. Let us take the case of Dr. P. C. Ray, the senior man in the Bengal P. E. S. He studied science at the Presidency College for four years (1878 . —82) up to the B. A. standard under Sir John Eliot and Sir Alex. Pedler. In order to round off his education he proceeded to England in 1882 and studied at Edinburgh for 6 years (i882—1888) and sat at the feet of eminent Professors of Science. He took the degree of B. Sc. in 1886 and that of D. Sc. in 1887. It is scarcely necessary to point out that for the latter qualification aptitude for original investigation *is* a *sine qua non.* Even after taking his D. Sc. he stayed on for another year *so* that *he* might continue his original researches and specialise himself in chemistry. At the completion of his six years' studies he appeared before the India Office, backed . by influential friends, and applied for a post in the education department ; but his efforts were unsuccessful. He was advised to return to India and apply to the local government. The sequel to this narrative can be told in a few words. Dr. Ray entered the Education Department in 1889 on a pay of Rs. 250 per month and served on that remuneration for 7 years at the end of which period he was promoted to the Rs. 400 grade and after some 17 or 18 years' service he got to the top of the ladder and was entitled to 'the maximum pay of the Provincial branch, namely, Rs. 700 per month. Other members of the service with distinguished European qualifications, *e. g.*, Dr. D. N. Mallik, Dr. Ganesh Prasad, Messrs. J. N. Das Gupta and M. Ghosh have met with a similar fate.

I have given an unvarnished statement of my own case in order to present a vivid picture to the Commission of the differential treatment accorded to the two branches of the service.

In the "Indian" educational branch the initial pay is Rs.500 with the *guaranteed* increment of Rs. 50 per annum, or in other words, in 10 years an officer gets Rs. 1,000 per month; then he is entitled to a further allowance of Rs. 100 per mensem and in special cases he gets a Principalship with a further allowance of Rs. 250 to Rs. 400 per month as also house allowance.

As far as I am personally concerned I may be allowed to state that the pursuit of science for its own sake has been a sufficient reward and stimulus to me; at the same time it is my duty to point out that the prospects held out even to the most deserving members of this service have failed to attract men of brilliant parts to the Educational Service ; they have fought shy of seeking a career in this department. I shall relate a short story here. While I was serving on Rs. 250 for years, a gentleman holding a high position in society asked my advice as to the future career of two of his sons who were my pupils. As he was anxious to give his boys the benefit of an education in England, I naturally suggested that they should study some branches of science and enter the educational service "What another P. C. Ray!" he exclaimed. From his own point of view I think he Was fully justified, for both his sons competed for and entered the Civil Service

The present system also penalises the intellectual activity especially the pursuit of science amongst our countrymen. India is a backward country-her people compared to that of the western countries lack in public spirit and self-help and in the power of 'organisation. Here the State is often called upon to. undertake duties which in England are taken up with alacrity by the people themselves. Scientific education is the crying want of India and one naturally looks up to the State for fostering and encouraging One of the ways in which the Government can do its duty in this matter is by providing employments to the scientifically trained Indians, but by a bitter irony of fate the Indian has been virtually excluded not only from the higher appointments in the educational service but also from the Geological Department, and rigidly denied admission in the Great Trigonometrical Survey, the Metereological Department, the Botanical Survey as also from the "Imperial" branch of the Pusa Agricultural Institute and the Forest and Telegraph departments, and so foth. The denial of a suitable career takes away all incentive for the specialised study of sciences either at home or abroad. An embargo has thus been placed upon the cultivation of science in this country.

The present method of selection by the Secretary of State is open to serious objection for more - reasons than one. It is now a matter of common knowledge that only men of indifferent attainments care to come outto India and the filling up of the Posts by them has seriously lowered the standard of scholarship in India. A raw graduate fresh from college even if he can boast of First Class honours, is a dark horse. The committee of the Dacca University Scheme have fully realised this evil as they observe :

"In general, men of about 40 years of age will be best. as younger men will not have had the necessary experience. At this age. too, successful men will have acquired habits of study and research which should.withstand the effects 'of climate and environment, Young Englishmen, however brilliant who, having only just finished their examinations" and started original work, come out to India to find in many cases their enthusiasm weakened by the lack of an inspiring environment, and their difficulties exaggerated by the absence of the accustomed facilities and the help of older men. Under such circumstances a few men of exceptional calibre and strength of-character will still manage to advance knowledge and earn a reputation, but the many, who might have been successful under more favourable conditions, will very soon drop original work altogether "— (P-"56.)

The method of recruitment in vogue has created serious discontent amongst the members of the Provincial Educational Service. The differentiation between the two services is based upon racial ground and not on merit, for it cannot be said that the higher service is filled with men of higher intellectual calibre. If sound scholarship, life-long devotion to the subject of choice and capacity for original researches be accepted as tests and criteria of an efficient teacher, I believe the "Provincial" men will on the whole score over the "Imperial."Pandit Hara Prasad Sastri, C. I. E., as an antiquarian, Professor Mono-mohun Ghose, poet and *literateur*, Dr. D. N. Mallik (wrangler) on whom the University of Dublin conferred the degree of D. Sc. on account of original researches in mathematical physics, Professor Jadu-nath Sarkar, who is rightly regarded as a high authority on "India under Aurangzib " have 'had few equals in the service.

Under the existing artificial and arbitrary mode of filling up vacancies in the Imperial branch, the best local men—natives of India—some of whom have earned a European reputation by their researches are excluded, while third rate men of Great Britain and Ireland find easy admission. It is a sad mistake also to take for granted that merely because a man has been educated in an Indian University he is necessarily of inferior calibre and attainments. The competition lies between the third rate men brought out from England and first rate Indians. In this connection I cannot do better than reproduce here the short speech which I delivered at the last " Congress of the Universities of the Empire" in my capacity as a delegate of the Calcutta University:

"I rise, my Lord, to associate myself with the weighty remarks made by my brother delegates from the Colonies, Prof. H. B. Alien (Melbourne) and Prof. Frank Alien (Manitoba).

"The Indian graduate also is placed under peculiar disadvantages when he undertakes to pursue his post-graduate studies in a British University. My Lord, I plead for a more generous recognition of the merits of an Indian graduate; he has, I am afraid, the -badge of inferiority stamped upon him simply because he happens to be an India-made ware. I can speak with some degree of confidence about the particular subject which I have the honour to profess, namely Chemistry. Now, of late there have been some brilliant students engaged in post-graduate researches and as their communications find hospitable reception in the columns of the leading British Chemical Journals, I take it that they are considered as of a fair degree of merit and yet it is a strange anomaly that when the authors of these investigations come over here and aspire for a high British degree, they are made to go through the trodden path in the shape of having to pass the preliminary examinations and this has. a depressing and deterrent effect upon the enthusiasm of our youths. I endorse the suggestion made by a previous speaker that such a scholar should only be made to pass through a probationary period under the guidance of a teacher whom he chooses and if he fully satisfies him the Colonial or Indian student should at once be allowed to go up for the highest degree on the strength of his thesis alone.

"Sir Joseph Thomson has spoken about the rich endowments and scholarships required to encourage a post-graduate scholar. The Calcutta University has already founded a good few post-graduate scholarships and expects to have more. But I beg, however, to remind the representatives of the British Universities present here that we in India "have from time immemorial held aloft the high ideal of plain living and high thinking and that with even comparatively poor stipends and bursaries we hope to achieve much.

"My Lord, I do not for a moment claim that the teaching our Universities impart is of the same degree of efficiency as in the sister British Universities—in fact we have much to learn from you-but I beg leave to remind you that in spite of their many defects and drawbacks, our Universities have produced some of the brightest ornaments of our country. The foremost lawyer of Calcutta-a man renowned throughout India for his high forensic attainments—is a graduate of the Calcutta University. Three of the most eminent physicians and surgeons of Calcutta who have attained to phenomenal success in their professional career are, again, graduates of my own University and last but not least the present Vice-Chancellor of our University, who enjoys the unique distinction of being three times in succession elected to his onerous duties by the Chancellor of the University, who is no other than the Viceroy himself,—I say, Sir A. T. Mookerjee is also a product of the same University.

"My Lord, before I resume my seat I once more plead for a more generous recognition of the teaching imparted in our Colleges."

In the sphere of original researches in science, especially in Chemistry, some of our graduates at the Presidency College are showing remarkable capacity—their investigations are being published in the leading scientific journals in England, Germany and America and yet whenever any vacancies occur in the department, their claims are cooly ignored and the sad spectacle is witnessed of the posts being filled up by raw graduates from England, who are admittedly their inferiors and who have got no original workito their credit.

The Indian graduates suffer a grievous injustice and the obvious way to remedy it would be to throw the gates of admission wide open to merit alone, irrespective of racial considerations. Recruitment should be in the first'place local and the power of selection should also be entrusted to a thoroughly representative Board of Literary and Scientific Experts in India. In case of a vacancy, the Board should be empowered to advertise in the local papers and to receive applications. It is only in the contingency'of a suitable candidate not being available on the spot,, a requisition should be made to the Secretary of State.

In the next place there should be one Educational Service in the country and the system of two compartments of the service, one called the Indian Educational Service and the other Provincial Educational Service, should be done away with. The proposed service would have one cadre of appointments with equal pay and prospect and the consideration of fitness and merit should be the only criteria for promotion to the highest posts of the service. In the case of Europeans appointed in England a special allowance not exceeding one-fourth of their ordinary pay may be given to,them in view of their service in a distant country. In other respects the rights.and privileges of the Europeans and the Indians in the service should be absolutely similar.

There is another strong reason in favour of employing Indian agency. A European naturally looks to India as a land of exile and his thoughts are always turned homeward. As soon as he joins his appointment, he begins to look forward to his furlough and even during summer holidays he often runs home.. Socially speaking, the European lives quite apart and it is only in rare cases that he is found to mix on equal terms with his pupils. The result is that that he fails to create anything like an intellectual atmophere. Moveover, the European when he retires from the service leaves India for good and all the experince which he gathered during his tenure of office are clean lost to the country. But the mature experience of an Indian after retirement are always at the disposal of his countrymen; he is in fact a valuable national asset.

Essay's & Discourses–pp. 157-167.
by Dr. P.C. Ray (1918).

RADHA CHARAN PAL

A STUDY

Born 1867

Died 1922

By

ACHARYA—P. C. ROY

16th Sept. 1931

বঙ্গ জননীর সুসন্তান দেশহিতব্রত
স্বর্গীয় রায় রাধাচরণ পাল বাহাদুর মহোদয়ের
মর্ম্মর প্রতিমূর্ত্তির আবরণ উন্মোচন কালে
শ্রদ্ধাঞ্জলি।

নহে মরতের তুমি, অমরার দেব, জানি'
লয়ে গেছে সুরধামে দেববৃন্দ তোমা টানি।
এসেছিলে ধরণীতে সাধিতে কর্ত্তব্য কাজ,
সাধিয়া করম নিজ, চ'লে গে'ছ দেব মাঝ।।

নয়নের অন্তরালে সত্যবটে গে'ছ চলে,
তবু পূত্র স্মৃতি জে'গে আছে অন্তস্তলে।
স্বদেশ কল্যাণ ত'রে যে কার্য্য করেছ তুমি,
ভুলিতে কি পারে তাহা তোমার জনম ভূমি!

দীন লাগি, করুণায় নয়নে বহিত ধার,
মুছাতে তা'দের অশ্রু ছিলে সদা আগুয়ান্।
ঈশ পদে রাখি মতি, সত্য পথে সদা গতি
ছিল তব চিরদিন, কে না জানে হে ধীমান্।।

উপযুক্ত পুত্র, লভি পিতার সদ্‌গুণ রাশি,
রাখিলে অতুল কীর্ত্তি সে সকল পরকাশি।
রোষকিম্বা তোষামোদ না ভুলিয়া কদাচন,
দেশ মাতৃকার সেবা ক'রে গে'ছ সম্পাদন।।

অকাপট্য সরলতা সত্য প্রীতি উদারতা,
দেশ ভক্তি জনসেবা, চরিত্রের পবিত্রতা,
স্মরি এই গুণরাশি আজিও, রাধাচরণ!
তোমার স্বদেশ বাসী ক'রে অশ্রু বিসর্জ্জন।।

কোথা তার মৃত্যু, যার কীর্ত্তি ঘোষে জগজ্জন।
"কীর্ত্তি যস্য সঃ জীবতি"...শাস্ত্র বাক্য অলঙ্ঘন
নহে মৃত,চিরদিন জীবিত রয়েছ তুমি।
কীর্ত্তি যার প্রাচারিছে সমগ্র এ বঙ্গভূমি।।

এ মর্ম্মর মূর্ত্তি দেব! অন্য কিছু নহে আর
বিনা গুণ মুগ্ধ জন সশ্রদ্ধেয় উপহার।
বরেণ্য সন্তোষ রাজ, সে মূরতি আবরণ
ভাদ্রের বিংশতি দিনে করিলেন উন্মোচন।।

কবি শ্রীজীবন কৃষ্ণ গাঙ্গুলী।

RADHA CHARAN PAL A STUDY

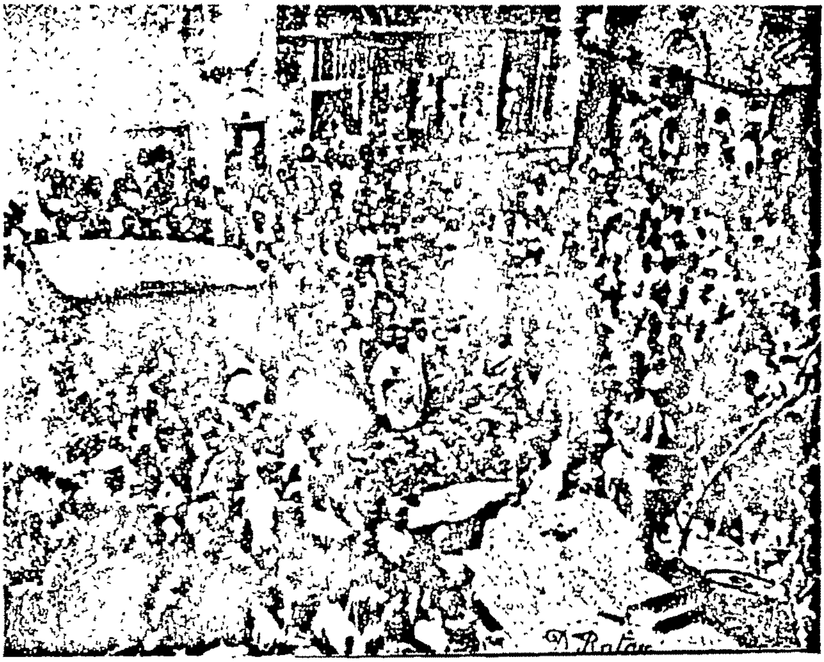
Radha Charan Pal was the only son of the political luminary Kristoday Pal who really shove the first and foremost in the political firmanent of India. His great father was the father of Indian politics—politics then an unknown thing in the whole of the continent of India. Heredity, though an exploded theory is mostly true in the case under review. William Pitt, John Stuart Mill, Austen Chamberlain, Winston Churchill and in our country, Radha Charan Pal have contributed at least one spark to the life of a languishing doctrine.

Radha Charan Pal inherited most of the qualities of his illustrious father. The diction, the silvery and stately eloquence, the sagacity and, above all, the independence of character of Kristodas Pal are beyond civil and almost beyond attainment in modem times. Nature seems to have capitalised Bengal by sending her geniuses only once for all. Keshab, Vidyasagar and Kristodas have not been matched by their peers in later time. They are towering personalities before whom we are but a race of pigmies.

There are very few sons who are like their fathers. The principle in that of decay and diminution. Instead, if there is replenishment in the line, it connotes a peculiar vitality. Radha Charan Pal has given strong evidence of this quality, hence his memory merits preservation Radha Charan Pal is a uniquepert sonality in the history of Bengal as the inheritor of the virtues and qualities of the sire. He was Bèngalee of the ancient traditional school. His filial piety partlook of the same character which marked that of his distinguished father. The Ashley Eden incident is known to many.*

Filial piety of the Ramchandra type seems to be the family trait of the Pals of Kansaripara.

If Radha Chanra Pal had any ideal before him after which to mould his character and intellect, it was his saintly father whom he adored as apostles do their master prophet. They want his relics to inspire them—"a thread of his garment, a lock of his hair or a drop



Peoples' tribute to the departed soul.

of his blood." The old massive table of Kristodas Pal, standing on the very spot where he wrote, thought and gave audience to his large clientele and where the son Radha Charan learn, inspired Radha Charan to whom it did the office of a reading and writing desk in his youth and the secretariat board during his municipal, legislative and public career in this city. Few love a father as did Radha Charan his sire—the saint. His example in this respect is a consolation and a hope in an age of over-wise children, trusting more their own judgment than that of either their parents or elders. Kristodas was to Radha Charan an image of his idolatry. The father very deservedly absorbed his whole admiration. He was his Alpha and Omega. He devoted all his life to translate his admiration into action. Nature had planted in him those germs of action which fructified in the fulness of time.

Radha Charan inherited a considerable fortune but pleasure was never his pursuit. He devoted himself to one idea, and that was to be like his great father. He inherited the geniality of his temper and his amiability. None ever observed him to be in a temper even under the most provoking of circumstances. A popular public man and an ideal son, Radha Charan Pal will be long remembered by his countrymen.

One very remarkable thing about Radha Charan Pal was his uncommon simplicity and innate modesty. Plain living and high thinking found its living exponent in Radha Charan. If he detested anything in the world it was ostentation. One vividly remembers the humour, always his own, with which he disclaimed the title of "RAI BAHADUR" that came to him unsolicited and the quotations he made were from his father's "HINDU PATRIOT" in which Kristodas Pal expressed himself on a similar occasion "We are not a little surprised to find our name among the Rai Bahadurs. May we ask what dire offence did we commit for which this punishment was reserved for us? We have no ambition for titular distinctions; we are a humble worker in the service of the nation, and would be quite content if we could but obtain the approbation of our own conscience and that of our fellow-countrymen and fellow-creatures, aye. also of the powers that be in the discharge of our function as a faithful interpreter between the rulers and the ruled and *vice versa.* For our part we are proud of the name of "Hindu Patriot," which we have the honour to bear and we hope we will not be accused of a braggart spirit if we say that if we can act up to our name, as we endeavour to do, the highest honour which can fall to our lot will be ours. We are certainly grateful to the Government for this token of appreciation and approbation of our humble service but if we had had a voice in the matter, we would have craved the permission of our kind and generous rulers to leave us alone and unadorned, following the footsteps of those honored and illustrious Englishmen by whose side we are but pigmies, who have preferred to remain without a handle to their names."

And this was the burden of his song. Even the most caustic of remarks drew from him only a humorous remonstrance or an anecdote. Like his father to do good to others was the motto of his life. The number of persons whom he helped to a position is legion. Innumerable families were catered for by him so that they were able to maintain themselves. Widows and orphans found in him the most sympathetic heart. A tribune of the people, his door was wide open to one and all. He gave audiences in the morning and had a good word for all who sought his help or interference. The house used to be packed from the stairs to the room where he sat at his father's old table listening to the grievances and doing his best, however forlorn was the cause. He fought winning or losing.

Radha Chanra Pal was an excellent speaker, a fine debater and an admirable pen-man in his own line. The child is father of the man While still a schoolboy, he used to gather round him a number of school-fellows and regaled them with his speeches. Though he was not a University man, his talent only confirms the theory that the crushing weight of University studies tells severely upon the growth of genius. Keshab, Lalmohan, Rabindranath, Bepin Chandra are notable examples. Radha Charan Pal parted company with his **alma mater** comparatively early, just in the midstream only to be brought up in a more inspiring atmosphere hallowed by the presence of his august father and his illustrious friends—the heroes of a bygone age—friends like the late Rajendralal, Digumber Mitter, Issur Chandra Vidyasagar, Keshab Chandra Sen and personalities of their stamp, stamina and calibre. This itself furnished Radha Charan with an education which no college or university could bestow. The son of such a father was bound to be at least a chip of the old block a spark of the Great Fire.

A political career the son must have. And at the age of twenty began a sort of asceticism—SADHANA the word for it—in the son who joined the great civic institution of the city—the Calcutta Corporation—as a stepping stone to a future Parliamentary career. He read, wrote and digested like a pupil going up for his terms. All Government and Municipal statistics became no less familiar to Radha Charan Pal than to those who actually manipulated them either in the Secretariat or in the Corporation Bureau. In the course of a few years Radha Charan Pal built for himself the reputation and the fame of an oracle and an authority on Municipal Government. His popularity as a Municipal Commissioner got him returned to the Council of the Corporation for a period of thirty-two years and this magnitude of his popularity rested on his deep attachment to the interest of the people in general, the tooth and nail fight he put up for the case of justice, the integrity and faithfulness with which he served the cause of the people, high or low, rich or poor, his sturdy independence of character and above all the inborn spirit of the guardian-angel he brough to bear on all questions that affected the helpless and the indigent in the City of Palaces. Radha Charan Pal was decidedly the champion of the poor—the born Knight Templar who wielded a ready spear against tyranny of any sort to which the poor might be subjected.

He was a moving encyclopaedia of municipal knowledge and gubernatorial information. Like his great father, he combined a rare malleability of temper with independence that would not be any the less in comparison with that of the sturdiest political Goliaths of the age and he was never afraid to call a spade a spade.

The diligence and assiduity with which he pursued his municipal or his legislative labours and the tenacity with which he stuck to the political doctrine of the greatest good to the greatest number, rightly deserve the encomiums which Macaulay bestowed on Mr. Courteney the biographer of Sir William Temple. "Mr. Courtney", says Macaulay, that Prince of English writes, "has long been known to politicians as an industrious, useful, upright and consistent member of Parliament.... He has at last retired from public life leaving behind him to the best of our belief, no personal enemy and carrying with him the respect and goodwill of many who strongly dissented from his opinions."

Radha Charan pal was a member both of the old and of the reformed Legislative Councils. It was he who book the initiative in diverse matters affecting the welfare of the people of the province and it was he who was the sponsor of many a measure which would eventually lead the people to the goal of government of the people by the people and for the people.

A member of the wealthier classes of Calcutta, Radha Charan Pal often evinced a moral courage which very few of those classes ever displayed before 1920. It was a most dangerous thing in the nineties of the last century or in the first two decades of the present century for a public man to do anything that would give umbrage to the executive authorities of the Government of this country. Hardly would any member of the middle classes far less one of the upper classes, venture to beard the lion in his den. Radha Charan Pal who could have been daubed with a knighthood or could have been invested with the honour of the Knight Commander of the Star of India preferred to be a plebian and side with the rising democracy instead of stepping into the shoes of either a carpet knight, a place hunter or a place seeker. In this respect he was the virgin diamond. Here was the worth of the whole man. He ran all risks. He totally forgot himself. He braved all dangers. He became desperate and like a crusader he rode with free lance whenever came the clarion call of duty to his motherland. Here he displayed all the valour, all the glow, all the chivalry, all the selfessness of a heroe. One is produ to know now that his countrymen have not failed to mark their appreciation of the great qualities of the heart of the patriot who is at par with those past leaders who now constitute the national pantheon.

The Mackenzie Act incident may still be remembered by many. It was an Act which whittled down the powers of the Commissioners leaving them as puppets in the hands of the Official Chairman whose decrees, as it were, they werer merely to register. This Act was passed in the teeth of severe opposition from the Commissioners. They cried hoarse but their cry was mere cry in the wilderness. As a result of it twenty-eight Commissioners resigned in a body as a protest against the high-handed legislative enactment. A meeting was held in the Town Hall in which Radha Charan Pal took a leading part and castigated the head of the Executive Government for riding roughshod over the feelings and sentiments of the people. This incident was dramatised and went by the name of "SABAS-ATAS" (Well done twenty-eight). The vacancy caused by the resignation of Radha Charan Pal was temporarily filled by a lawyer with a lucrative practice. More often than not he had to take his sagacious advice. Once it so happened that on a serious matter concerning the municipal government of the city Radha Charan Pal had to help him substantially with a written speech in which facts and figures were so admirably marshalled that when the speech was being read out at the Corporation Meeting the Official Chairman could not help remarking :—"Oh; I see it is Radha Charan Pal speaking."

The Beadon Square riot during the anti-partition agitation is still green in the memory of the present generation. It was Radha Charan Pal who sat down along with Narendra Nath Sen, cousin of the late Keshab Chandra Sen, to record evidence against police tyranny and lawlessness. This was the first people's commission to investigage the conduct of State officials accused of maltreating the members of the public. It connotes no small courage in its conveners during the Viceroyalty of Lord Curzon, well known for his severity and iron justice.

The devasting Calcutta fire of 1910 which consumed the famous family library of Babu Kaly Prosanna Ghosh of Jorabagan containing thousands of volumes of rare works and his palatial mansion is a notorious episode in the civic history of Calcutta. It was Radha Charan Pal whose ire and indignation was roused by the report of the cold-blooded conduct of the Calcutta Fire Brigade which was under the captaincy of the Police Commissioner of Calcutta. He at once on his own initiative set up an enquiry and mercilessly exposed the vagaries of the Government Department much to the horror of both friends and foes. But Jack was fighting the giant. His friends really got alarmed. What would happen to Radha Charan Pal became the concern of every citizen of Calcutta. Oh! But God blesses his faithful soldiers. The whole department was castigated and the chief officers were dismissed and others were suspended and the Government overhauled the Fire Brigade onthe basis of efficiency comparable to that of London. To-day it is a note-worthy institution. Fire is the most negligible factor in the life of this city. One and all may now go to bed with a comparatively easy mind and thanks only to Radha Charan Pal the guardian saint who preserved Calcutta against fire. A more crude and primitive age would have worshiped him as a second Varuna and been happy.

One of many patriotic acts of our illustrious countryman Radha Charan Pál, just before his demise was his personal enquiry into the condition of life of hundreds of young Bengalee martyrs who were sent to jail.

Last homage at the Burning Ghat

This lacerated his heart and day and night he was solicitous of their welfare and he moved in the Council a resolution for the trreatment of political prisoners as first class misdemeanants as is done in England and in all other civilized countires of the world.

He was a great believer in the Charka and long before he broached this matter in the Council he introduced the Charka among those helped by the Indian Committee of the District Charitable Society of which he was for a long series of years up to the last day of his life the most Honoured Secretary. A regular staff to teach the use of the Charka and Handlooms was maintained, dusters and napkins were made and yarn was spun. A market was secured for the products and the sale-proceeds, after deduction of cost price, were equitably distributed among inmates of the District Charitable Society (Indian Committee) as sort of subvention to the monthly stipends granted to them for the support of their families.

In connection with the public meeting held for the release of political prisoners he said in the Council "I have seen peace loving and innocent citizens from one end of the street to the other ruthlessly and brutally assaulted by the police sergents. Is that government? Are we living under the civilized British rule and such a benevolent government as the British Government? Our heart bleeds to see this sight (hear, hear)..... The country has unequivocally expressed what it feels and thinks on the recent action of the Government. It is an act of unwarrantable aggression upon the fundamental rights of citizenship, the right of free association and of free speech on the part of the people."

Radha Charan Pal wanted India to remain as a commonwealth within a commonwealth—a community of free men and women the greatest the world has ever seen and he gave vent to this idea on many a platform and in the Council.

There are other patriotic acts of his which are too innumerable to set out in this short study.

The great son of the Great father breathed his last on the 9th December 1922. A void hardly to be so worthily filled in the civic life of Calcutta was created. The news flashed like electricity through the length and breadth of the country. Everybody thought that he had lost a friend. An immense concourse of people thronged round his residence at Kansaripara. The unexpected had happened. He had been cut off from a most useful career much before his time. He had needed rest which he had denied himself during the whole of his public career of more than a quarter of a century. The instinct of service to the cause of his beloved city and country, kept in harness, his frail frame in his later days. The mammoth gathering that surrounded his earthly remains was filled with sorrow and dismay at his untimely demise. Tears filled the eyes of widows who lost a guardian, of orphans who lost a father, of grown up men of business who lost a patron, of worthy citizens who lost a friend and a colleague, The lamentations of those whom he left behind baffles description. It was not the mere parting of a public man and a patriot,but it was the parting of a friend, a shepherd and a friend of the people. Tears and entreaties were no longer availing. Providence had ordained for him eternal rest. He was bound for another shore. The bier was waiting to take him to the sacred Ganges from where, through fire and water, he would go back to his God and to his Father, whose work he had carried out most dutifully and faithfully to the last day of his life in a world of many a trial and many a heavy ordeal. A huge procession followed his bier to the Nimtollah Ghat through familiar streets, through many a scene of his work resounding with a sorrowful din that came from every window, thronged with men, women and children to have a last glimpse at the great man who had filled so large a space in the public life of Bengal.

The pyre blazed and the true and chivalrous Knight of Bengal passed away plunging the people into an ocean of grief.

Such a life so true and noble is an object worthy of emulation by the people of our country.

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* The Ashley Eden incident :–Once Sir ashley Eden, the Lieutenant-Governor of Bengal called at the house of Kristodas pal at Kansaripara on horse back. The father of Kristodas Pal happened to be sitting at the time at the gate of the house with only a small dhooti on. The Lieuntenant-Governor after getting down from his horse asked that old simple man to hold the reins of his horse. At the time Kristodas who was working on the varandah of the first floor which overlooks the gate of the house noticed the Lieutenant-Governor come and as soon as he heard that his father was being asked by the Lieutenant Governor to hold the reins of his horse, Kristodas rushed down to the gate of the house shouting, "What are you doing Lieutenant Govenor? He is my father, he is my father. Let me hold the reins for you." The Lieutenant-Governor got stunned for the thought Kristodas's father who

was sitting outside in such simple attire with no coat or shirt and shoes o, to be a servant of the attire. He was abashed and made suitable amends then and house. by requesting Kristodas to translate his most sincere apology there his father for his untoward conduct which Kristodas did to also made the fullest apology to Kristodas. The Lieutenan and Governor himself then tied the reins of his horse to the iron-railing of the gate and wentupstairs with Kristodas to the verandah where they had a heart to heart talk for fully an hour.

Courtsey : National Library Kolkata. This booklet first published by P. C. Ray on 16th Sept. 1931. Sri Radhacharan Pal 'was a moving encyclopaedia of municipal knowledge and gubernational information.'
Prof Nilay Saha collected this booklet from the sources.–Editor.

A. P. C Ray–A Collection of Writings (Vol. V-A)

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A BRIEF NOTE ON MADHUSUDAN

Mr. M. S. Das had many sided activities and there are many competent authorities to speak about them; but I shall confine myself to only one side of them viz. the one which has been the obsession of my life.

The first time I came across him was some thirty years ago, when I was invited by the then Director of Public Instruction Mr. Archsdale Earle (afterwards Sir) to deliver a course of lectures to Junior Teachers in Cuttack.

Mr. Das very kindly invited me to see his Art School and I availed myself of the opportunity to see his well-known 'Orissa Art Wares' which was then languishing for want of adequate public support. He had organised a workshop where nearly 100 men were engaged in the craft, specially the delicate gold and silver filigree works for which Cuttack was famous at one time. Mr. Das seemed to wax eloquent over the possibilities of the delicate arts which had been in vogue from time immemorial, but for want of support was almost dead. He spent quite a fortune out of his own purse for the resuscitation of the lost glories.

The next time I met him was when I visited Cuttack in 1924, as the President of the Utkal Provincial Congress Conference. This time too Mr. Das invited me to visit his Utkal Tannery, which he had established on about 40 acres of land near Cuttack Station, and in which he had also invested a very considerable sum of money of his own. Unfortunately he did not get much response from local public. It is one of the drawbacks incidental to the cause of Industry in this country that those who have been foremost in starting industries have been as a rule (in Bengal and Orissa) lawyers, doctors etc. The most essential thing requisite in business affairs is previous training at an early age in them.

It has been found that in England as in America, some of the foremost of businessmen and industrialists have risen *from* the ranks who are innocent even of secondary education not to speak of

University. Andrew Carnegie, Henry Ford and Eastman (of Kodak) had not I'm afraid, even the benefit of secondary education. In England William Harcott" Lever, Sir Thomas Lipton in fact almost all the founders of big business houses were innocent of University Education.

But in our unfortunate country those who have got ideals and enterprise are generally men of high culture and education and they labour under a serious disadvantage when they have got to give a practical shape to their ideas and so often we have to witness tragedies. I need not here pause to relate the stories of failure in undertakings started under such auspices; but this is no reason why one should sit idle with folded hands. 'Failures are the precursors of success for future generations'. I have myself burnt my fingers over one or two undertakings but I have never been dejected rather spurred to greater activities by such temporary set-backs.

If the new generation which has sprung up since the demise of Mr. Das, taken up the cue and builds on the foundation laid by him at enormous sacrifice to himself, the future of Orissa will turn into a much brighter, happier and more prosperous one specially with the advent of the new Province, which, too, owes its creation to Mr. Das.

Mr. Das had realised at a time when our country men had no such awakening that unless we could revive and create new industries, there will be no economic salvation for our people who are solely dependent on uncertain agricultural pursuits.

I shall now conclude with one word - viz. that Mr. Das died a martyr to the cause of Industry and to the uplift of his countrymen.

'Madhusudan Das'—by Shoila Bala

Farewell address by the students of the Presidency College (1916)*

Sir,

On the eve of your retirement from the field of your labours in the Presidency College, permit us, your students of the college, to offer you this humble token of our united love and regard.

Your place in the college, Sir, we are afraid, can never be filled. Men will come and men will go but where else can we possibly expect to find again that sweetness of dispositon, that vigour of simplicty, that unweaied spirit of service that broadbased culture, that wisdom in deliberation and debate which for the space of thirty years or more endeared you so much to your pupils?

Yours was, Sir, indeed no small achievement. Your way of life, with its distinct Indian traits, recalled us to the sweet and simple and manly days on India attainment. You have been to us all through a guide philosopher and friend. Easy of access, ever-pleasant, ever-willing to help the poor and needy student with you, counsel and your purse, living a life of sturdy, celibate simplicty, with genuine patriotism, not loud but deep, you have been to us an ancient Guru reborn, a light and an inspiration from the treasure-house of old Indian spirituality.

When the history of India's intelectual attainment in the modern era comes to be written, your name will be mentioned in the very vanguard of progress as the maker of modern chemistry in India. The credit and the glory of being the pioneer in the field of chemical research and of giving the impetus to scientific curiosity in this country is yours. Your "History of Hindu Chemistry" has opened a new chapter of Indian attainment and built a bridge over the abyss of the past whereon our young researchers may shake hands with the spirits of a Nagarjuna and a Charaka.

And you have effected more. The theoretical study of chemistry has impelled you to it's application to the natural resources of the country and the Bengal Chemical and Pharmaceutical Works is a living testimony to what un-aided Indian Science and business organisation can accomplish.

In the evening of your life, Sir, when men seek for rest and repose, you have preferred to remain in harness, to make the torch of Science you lighted a generation ago, burn steady and clear! May the College of Science and the cause of chemical research profit long by your untiring zeal! May many more and yet many more groups of eager investigators be sped on this path with your blessing! And may we, Sir. the present students of the Presidency College and our successors, occupy a warm corner in your loving and capacious heat!".

(*Life and Experiences of a Bengali Chemist—P.C. Ray, Vol-I, pp 188-189)

Reply of Sir P. C. Ray

Mr. President my esteemed collegues and young friends :

I Hope I shall be pardoned if I fail adequately to give expression to my pent-up feeling—so much I feel and overpowered at the kind words, nay, eulogistic terms in which you have been pleased to refer to me. I know I should make due allowance for them for on an occasion like this you are apt to over indulgent and forging to my many failing and short comings and equally prone to lay undue stress upon my good points. if you been able to discover any. However, let that pass. Gentlemen, I have often regarded it as a divine dispensation that my dear friend and distinguished colleague (pointing to Sir J. C. Bose) and my humble self should have been working side by side for close upon thirty years, each in his own department, cheering each other up, through evil report and good and I trust that the fire which it has been our lot dimly to kindle will be kept burning on from generation to generation of our students, gaining in brilliance and volume and intensity till it will have illumined the whole of our beloved motherland. Pherhaps some of you may be aware that I have never cared to set much store by what are ordinarily called worldly effects or possessins. If, however, any one were to ask me what treasures I have piled up at the end of my career at the Presidency College, I would answer him in the words on Cornelia of old. You have all heard of the story of the Roman matron, how on one occasion a patrician lady had called on her and was displaying with vanity her ornaments and jewels, and how when she asked Cornelia in turn to bring forth her own jewellery she (Cornelia) begged to be allowed to postpone her exhibits for a time and patiently wanted till the return of her two sons from school Then pointing to her boys (famous afterwards as the Gracchi), with conscious pride she exlaimed. "These are my jewels". I should also Cornelia-like point exclaimed, "These are my jewels." I should also Cornelia-like point to a Rasik Lal Datta, a Nilratan Dhar, A Jnanendra Chandra Ghosh, a Jnanendra Nath Mukherjee, to mention the names of only a few representatives of the devoted band of workers who have gathered round me from time to time. Gentlemen, in my article on the "Reflections on the Centenary of the Presidency College", in the current issue of your College Magazine. I have tried to bring home to you the noble part which our great institution has played in the making of new India, I hope it will be yours to keep up its glorious traditions.

Gentlemen, it is impossible for me to think that I am severing my connection with the Presidency Colege; all my cherished associations are entwined round it—every nook and corner of the Chemical Laboratory, even the very brick and mortar, is redolent of fragrant memory. When I further recollect that as a boy I was for four years a student of the Hare School, which is only an affiliated feeder of the parent institution and that I was a student of the science department of the College for another four years, it will readily be seen that my connection with your College extends to a period of thirty-five years, and it will be my dying wish that a handful of my ashes should be preserved somewhere within the hallowed precincts of your academy, Gentlemen, I am afraid I have gone beyond the limit with which I intended to confine myself. I thank you once more from the botton of my heart for your fine address, and I assure you that the memory of to-day's function I shall cherish to the last day of my life.

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* Presidency College Mazagine vol iii, Septembar 1916. p. 334
Life and experiences of a Bengali Chemist vol I. Acharya Prafulla Chandra Ray

National Education Basis of Attainment of Swaraj

THE VERNACULAR MEDIUM

The following Presidential address was delivered by Acharya Prafulla Chandra Roy at the Silver Jubilee of the Marwari Education Society at Wardha on Thursday :—

I highly appreciate the honour you have done me by inviting me to preside over the Silver Jubilee of the Marwari Siksha Mandal. I have been for nearly half a century a teacher in the two premier institutions of Bengal—the Presidency College of Science and my activities have mainly been confined to the higher branches of scientific studies. But ever since 1921—the year of the great unpeaval following in the wake of the Non-co-operation movement—my attention has been directed to what has been called the national system of education as a basis for the attainment of Swaraj. I was so much under the spell of it that I unhesitatingly declared that Science can afford to wait but Swaraj cannot, I threw myself heart and soul into the organisation of national schools primarily in Bengal and to a limited extent in the different parts of India. I was asked to preside over the Jamia Millia Islamia (National Muslim University) as also the Vidyapith of Ahmedabad when Mahatmaji was an inmate of the jail of that very place.

At the very outset I was struck by the fact that the educational system in vogue for nearly a century in Bengal. i.e. since the foundation of the 'Hindu Maha Vidyalaya' (the old Hindu College) by the efforts of David Hare, Rammohan Ray and others, had taken such a deep root in the soil that the minds of the teacher some of whom had given up incrative appointment under the Governmnet could not be drawn aside from what they had been taught under. These schools soon became replicas of the schools under the University—though labelled national'.

Moreover, Bengal is par excellence the land of a highly emotional people. Under the spell of patriotic fervour thousands left the

'Golumkhenes' at they were nicknamed and joined these schools which sprang up like mushrooms all over the province. Most of these were located in huts improvised out of ordinary bamboos and straws. I was often a guest in some of these. But there was no abiding faith underlying the movement. The enthusiasm began to flag and the guardians of the pupils began to shake their heads. Affiliation to the University has been a condition indispensable to the existence of our schools, as they are regarded as tributaries to the colleges preparing for the degree examinations The Bengali has always looked upon the 'Varsity Hall-mark as the passport to a successful career in the Government services as also in law, medicine, engineering—the professions as they are called. Naturally the movement was shortlived; it blazed up like a fire of straw and was soon a heap of ashes.

What has been spoken of Bengal applies more or less to other provinces and hence I shall take the liberty to trespass upon your attention for a moment to glance through the effort and the attitude of our ancestors nearly a century ago towards education.

MINUTE BY JUGANNATH SUNKER SETI (1847)

I am peresuaded to say that the vernacular languages possess advantages superior to English, as the medium of communicating useful knowledge to the people of Western India. It cannot be denied that they must have less difficulty in understanding whatever is communicated to them in their own language than in a foreign tongue. When a native is inclined in prosecute, the study of English, his progress is more rapid, and his usefulness doubled, provided to be first well-grounded in his own language. I say his usefulness will be increased, because it is only by this preparation that any knowledge he may have acquired can be imparted by him to his countrymen through the medium of the varnacular language. It is in my humble opinion an impossibility to teach the great mass of the people a language, such as English, so widely different from the crown if our object is to diffuse knowledge and improve the mind of the natives of India as a people. It is my opinion that it must be done by imparting that knowledge to them in their own language.

VIEWS OF MR. THOMAS (MADRAS)

But about this time (1853) the pendulum action so often observable in Indian administration began to swing forward again, and the authorities of the day, among whom the Governor Sir H. Pottinger and Mr. Thomas Munro, then Chief Secretary to the Government of Madras and also a Member of the Council of Educaton were most conspicuous, began to revert to the views entertained by Sir Thomas Munro, in favour of the Primary Education for i.e. masses having the first claim to assistance from the State. They were of opinion that the system which had been adopted both in Madras and in Bengal Presidency and which contemplated the imparting of a high measure of education to the few, and exclusively through the medium of English must fail to produce any great or general effect upon the national mind Mr. Thomas views deserve to be recorded even in the very brief outline that is given here. He declared that such a system a reversal of the natural order of things, and that the attempt to educated and enlighten a nation through a foreign language, was opposed to the experience or all times and countries, and that English must ever be in this land to the masses an unknown tongue.

"A smaltering of English may be acquired by a considerable number about our towns, or in immediate communication with the few English residing in India; but the people (the women as well as men) will, as a whole, only think and speak and read in their native tongue and their general enlightenment or education must, and I believe can only be attained through this channel; and on a wide basis, therefore of a solid, though limited, education, through the means of the vernacular languages, must be given to those classes which now receive education, before anything permanent will be effected.

LATE BEGINNING OF FOREIGN LANGUAGE

I believe that the lesson why so much time is wasted on foreign-language-study in India is that the children begin to study a foreign language much too early. There is a common idea that the younger the child, the better he learns the foreign language. This may bed ue under the age of eight; a very young child may unconsciously pick up a foreign ianguage better than an older person can acquire it by study. But there is a great danger that such billingualism in early childhood may be detrimental to the mother tongue.

At present we teach English to vast number of children who will never really have a great need of English and who are intellectually incapable of mastering a foreign language.

Then again, we lay too much stress on College education.

"The true University of our days is a collection of books" says Carlyle in The Hero as Man of Letters.

Mr. H. G. Wells adopting as his text the above dictum further amplifies it and pertinently observes.

"Now the frank recognition of the book and not the lecture as the substantial basis of instruction opens up a large and interesting range of posibilities. It releases the process of learning from its old servitude to place and to time. It is no longer necessary for the student to go to a particular room, at a particular hour to hear the golden words drop from the lips of a particular teacher. The young man who reads at 11 o'clock in the morning in luxurious rooms in Trintry College Cambridge, will have no very marked advantage over another young man employed during the day who reads at 11 o'clock at night in bed-sitting room in Glasgow."

If one took a census of the greatest of world's men and women, I feas he would be surprised to discover that the majority of them owe very little to Universities or indeed to any educational system. Shakespeare knew little Greek and less Latin Our Keshab Chandra Sen and Rabindra Nath, Sarat Chandra Chatterjee the prince of novelists and story writers. Girish Chandra Ghosh the foremost of our dramatists, never crossed the threshold of a University. Whilst on the one hand, however the chage of moulding mediocrity in the University system is not altogether unfounded the current Emersonian aphorism that "Universities are, hostile, genius." on the other hand, not wholly justifible.

An Englishman, an educationist, who has entered into the spirit of

Indian life exclaims with bitterness—"Similarly, official suggestions for the wider use of the vernacular in schools have been atributed to a desire to restriet the teaching of English and to revert to the policy of divide et impera," The Education of India, by Mayhew, p.

I allude to all these, because, I have, sometimes, been taken to task for preaching the supreme necessity of substituting vernacular for English as the medium of education even in the higher classes.

Why then this mad infatuation for the English medium and the wastage of seven to eight years of the most precious period of a boy's or girl's life?

If I have devoted so much space to the discussion of this aspect it is because Mahatmaji wants us to mix with the masses on terms of equality—wants education imparted through the medium of vernacular as also the orientation in our mentality so that village life may be rendered attractive and that earning a livelihood and dignity of labour may be slowly and gradually acuired.

The first requisites are :–

(1) Improvement of agricultural methods so that two blades of grass may grow where formerly grew one, which being interpreted in modern phraseology means the doubling of the produce of the land.

(2) Improvement of the cattle especially of the milch cows and buffaloes.

(3) Application of modern methods to the age-long obsolete processes.

As regards these I shall speak from my own experience as gathered in some of our Khadi centres, notably in Sodepur near Calcutta and at Atrai in the District of Rajshahi. It is fortunate that Mahatmaji has visited these in course of his tours in 1925 and 1927.

Last X'mas week from my cottage at Atrai watching all around I noted down:–

"I am surrounded on all sides by thousands of cabbages and cauliflowers, brinjals and radishes grown on Irrigated and fertillsed soil. My eyes are festing on the pleasant sight. I can now appreciate the mood of mind of the Emperor Diocletian, who as Gibbon tells us, when he was solicited my Maximian to reassume, the reins of government and the imperial purple, rejected the temptation with a smile of pity, calmly observing that, if he could show Maximian the cabbages which he had planted with his own hands at Salona he should no longer be urged to relinquish the enjoyment of happiness for the pursuit of power.

Agricultural pursuits must be made a source of profit and pleasure. But here comes the real difficulty. There is an inborn and inherent reluctance on the part of our bhadralok class to manual labour. In my own school and in a college in the district of Khulna we have secured Government grant and also the loan of a teacher well up in scientific agriculture. But, unfortunately, the boys as also their guardians have a horror of the plough and the spade and the tilling of the soil has to be carried on by engaging hired labourers, and it is found that on spending one hundred rupees or so, the produce of the land, when sold in the market, barely fetches rupees twenty.

I find many parallel instances in Booker Washington's "Up From stavery." "The experiement on manual labour and education side by side as narrated in the Tuskegee University programme afford valualble suggestions for us. It should be remembered that they refer to the negro population, a few years after their emancipation. But the negros where inured to hard labour; but even if their leader had to encounter such initial difficulties, we must be prepapred for far greater difficulties.

I am also quoting a few extract from a small book by two eminent agricultural researches at the Oxford University who had also intimate contact with agricultural problems in England. It is entitled 'Back to the Land'.

The small holder and his family enjoy no protection under the statutory regulation of hours of labour. There is no Saturday half-holiday for them, no overtime pay, no special rates for Sunday work. When the time worked by the small holder and his family is priced at the current rates of the Agricultural Wages Board,—It is often found that their actual labour income is far below that which they would have earned had they been working for wages.

"It's nothing but work, work, work, morning, noon and night. I'm about sick of it all. But it's no use, we have to go on; will toll something of what I did during the past summer and autumn, Of course, we are short-handed; most of the boys get into the nearest towns these days, and we are to the same fix as other holdings. The women are expected to take the place of the boys and do their own work as well."—The Country woman on her Day's Work on a Small holding.'

"Success is a family concern, to which the small holder's wife and children must contribute. Whereas the wage earner has no more than a living they have also a way of life. Against this, it can be argued that the small holder is working for himself and that the eight-hour-day means nothing to him if there is work to be done on his holding. He is his own master, his home is not a tied cottage, and he cannot lose his employment at a week's notice. His standard of life is that of the farm worker, but is status he is a farmer. Often he may feel that his foot is on the ladder, and someties, as will presently apper, he moves up it."

"Quite a number of letters came from parent protesting against their children engaging in labour while they were in the school. Other parents came to the school to protest in person. Most of the new students brought a written or a verbal request from their parents to the effect that they wanted their children taught nothing but books. The more books, the larger they were and the longer the titles oriented upon them, the better pleased the students and their parents seemed to be."

It is necessary to bear the above in mind as there is a halo of romance encircling the agricultural occupation as affording a career for our youngmen.

The worker in the village must impose on himself a standard of life different from everything to which he has been accustomed. The urban bred youngmen has a fascination for buses, cinemas, football matches, paved roads, water-supply and sanitation. In other words, he must give up habits of luxury which he has imbibed from the town.

Not only he has to accommodate himself to a lower standard of living, but he impose both upon himself and his family a degree of frugality which only those who know him can appreciate.

Farming and dairying must go to gether as we have at Sodepore and Atrai. Then, again, if we look at the export of cattle hides from the various ports of India. Calcutta, Madras, Bombay and Karachi, we shall be staggered by the figures in crores of rupees at which these are valued. But our selfless and indefatigable organiser and worker, who, along with his life-partner has dedicated himself to the service of the country, has recently started a 'Harijan Tannery' in a suburb of Calcutta.

(Acharya P. C. Ray's address on National Education as reported in the Amrita Bazer Patrika dt. 22.10.1932 in reprinted.--Editor.)

Courtsey : National Library Archives. Kolkata.

Industry & Business

Swadeshi And Revival of Home Industries

I highly appreciate the honour which you have done me in inviting me to open the Exhibition in the Imperial City of Delhi and I thank you most heartily for it. Delhi has seen the rise and fall of many Dynasties and Empires in India and has a history which stretches back to a very remote period. It has also a brilliant future and a better place cannot be selected for holding an Exhibition on such a large scale which, let me hope, will attract the interest of the whole of Hindusthan.

There is no denying the fact that our country now occupies a very low position in the industrial world. The poverty of India, which was famous for its riches, has now become proverbial. The past history of large towns and cities bears testimony to this change.

Lord Clive in his evidence before a Parliamentary Committee said, "The city of Murshidabad is as extensive, populous and rich as the city of London, with this difference that there were 'individuals in the first possessing infinitely greater prosperity than in the last city.' To-day one can pass through this once-famous and historic city without noticing any vestiges of its former affluence. Less than 150 years ago, the whole commerce of Dacca was estimated at one crore of rupees, and its population at 200,000 souls. In 1787 the export of Dacca muslins to England amounted to 30 lakhs of rupees; in 1817 they ceased altogether. Families that had lived in affluence were reduced to penury. Gone are those days of opulence and splendour with the gifted weavers, and the dyers."—Cries Mr. R. P. Masani after quoting the above. "in the same way many other handicrafts such as carpet-making, embroidery, carving, paper-making, jewellery, even architecture and sculpture, have languished and decayed. How far the dead-weight of a foreign yoke and how far the direct competition of the trade of England have been responsible for such impoverishment of a once thriving country we shall not now pause to examine. Let it suffice to say on the authority of Sir James Caird, that there is no class which the British rule "has pressed harder upon than the native weaver and artisan."

Bernier, the celebrated traveller of the 17th century, speaks in most glowing terms of the silk industry in Bengal during his time : 'There is in Bengal such a quantity of cotton and silks, that the kingdom may be called the common storehouse for those two kinds of merchandise, not of Hindustan, or the Empire of the Great Mogul only, but of all neighbouring kingdoms, and even of Europe The same may be said of silks and the silk stuffs of all sorts. It is not possible to conceive the quantity drawn every year from Bengal."

Tavernier also says, "Kasembazar, a village in the kingdom of Bengal sends abroad every year two thousand bales of silk, every bale weighing a hundred pounds"

To-day the silk industry of Malda and Murshidabad is in a bad way, thanks to the keen competition with Japanese silk of superior quality and imported artificial silk of the value of four croses of rupees recorded in a recent prosperous year. As I am writing this portion, a correspondent in Calcutta daily (16-2-33) who signs himself as "A voice from Malda" thus moans the lot of Malda;

"For the last two years the people of Malda have been suffering from acute economic distress. The silk industry of Malda which at one time was the glory of Bengal in almost in a moribund state. The mulberry lands which supplied food to the silk cocoons were sold in normal conditions at Rs. 1000 per bigha. Now the sme land dos not invite purchaser at the rate of Rs. 10 per bigha."

Taylor in his Topography of Dacca thus speaks of the prosperous days of that capital city, due to her famous muslin.

"All the thread in spun by women who generally employ their leisure hours in the business. ***The spinning of thread afforded employment to all ranks and classes of inhabitants of the district in former times. This branch of industry began to be affected in 1824 when British Yarn was first imported into the district, and since 1928 it has been in a rapidly declining state".

“The manufacture of thread, the occupation in former times of almost of every family in the district is now, owing to the comparative cheapness of English thread, almost entirely abandoned, and thus the arts of spining and weaving, which for ages have afforded employment to a numerous and industrious population, have in course of 60 years, passed into other hands that supply the wants not only of foreign nations, but of the rivalled country itself.”

There are many causes and circumnstance which have brought about this condition; whatever be the causes, our industrial backwardness is a solid fact. We have been thrown all on a sudden into the vortex of world competition ; while we have been moving at a snail’s pace economically and socially speaking other countries are forging ahead of us. Motor cars, motor buses and motor lorries are fast replacing our carriages drawn by horses and carts drawn by bullocks. Only the other day I was going through Mhow, Indore, Ujein and other towns of central India. I found hundreds of bullock carts crowding the roads and carrying bales of cotton—the new season’s produce. I asked some of my friends why motor-lorries have not yet been in evidence. I was told that one or two solitary lorries have already been plying. Needless to add that it is only a question of time when the bullock carts in these regions, as in the other parts of India, will be as rare the ‘as ttier “proverbial dodo. Thus thousands, nay, tens of thousands of carters and hackney carriage drivers are having their bread snatched away from their mouth. Some of you will be inclined to indulge in cheap sneers at my expense and to exclaim that these tardy and crawling modes of locomotion are bound to disappear in these days of fast communication. I am not here to protest against the adoption of the modern inventions. I confess I am myself a great sinner in this respect and at least three firms with which I happen to be intimately connected use these swift runners. My point is that our very helplessness has made our unhappy land the dumping ground for these innovations. If we could make our own motor cars and buses etc., thousands of our hungry people would find employment and the money now drained away would remain in the land. As it is, a tragedy is happening under our very eyes. Every day enamel and aluminium utensils are replacing brass-wares; celluloid toys of. Japanese make are to be found everywhere in our railway stations and towns, displacing the corresponding indigenous toys. In a word, every class of our arlizans—the weavers, the spinners, the braziers, the potters, the iron-smiths and handicrafts men of diverse sorts have been and are being deprived of their hereditary avocations and means of livelihood ; thus increasing the pressure on land, which owing to over fragmentation scarcely yields enough return for bare existence. In 1880 the late Sir William Hunter made the authoritative statement that one-fifth of the population of India did not know the pleasures of a full stomach. To-day it may be asserted that matters have drifted from bad to worse and that one third of our population shares the same fate. I have shown elsewhere from Government statistics that even in Bengal, where nature has been unusually bountiful, there is not enough food-stuff grown in the soil to support her people and the surplus rice they export represents really "hunger-surplus".

Are we to remain helpless and passive spectators of these dismal and heart-rending episodes ?

While our Government has been indifferent if not callous to this ruin of Indian industries, let us see what the national Government of Japan has done for her people. I shall quote from two standard authorities :

"It is the state, also, which has been mainly responsible for the introduction of new industries into Japan * * * where it has not actually provided the capital for new enterprise, it has frequently helped by granting subsidies or protection to the manufacturer, besides providing him with loans from the official banks".—Alien : "Modern Japan and its Problems".

It must not be forgotten, however, that the Japanese industrial and commercial enterprises were, roughly speaking, undertaken by the state from 1870 to 1883. During this period the Government owned the main factories in Japan and worked them, owing to the lack of experience of the people in regard to modern methods of business management. In order to educate the people in technical and other knowledge the Government had to establish and supervise these factories. For instance, the Government owned railways, coal and other mines, ship-building yards, textile factories, including silk, cotton, wool-spinning and weaving mills, and also factories for the manufacture of glass and paper.

"During the thirteen years following the Meiji Restoration that is, the first half of the period (1868-1893), the industries oi Japan may be said to have been in the age of industrial infancy under State management. About 1883 the industries under State management were gradually handed over to private enterprise, which was at the time subsidized by the state for the purpose of encouraging staple industries ; thus the policy of state management was replaced by private enterprise. * * * * * The period of self-controlled industries ends with the Japaneses-Chinese War, 1894, which was followed by preparations for future industrial development."—Uyehara : "Industry and Trade of Japan".

On the eve of constitutional changes of a far-reaching character it is but meet and proper that our countrymen should direct their attention to the economic condition of the country. Political freedom should go hand in hand with economic progress and both are naturally interdependent. At the present day even the free nations of the world are in the grip of economic distress and our country which is backward in industry and commerce cannot escape it but is bound to share the consequences of this world condition in the most acute and severe form especially when we are unable to guide and control our own fiscal and financial policy. Coming from Bengal, 1 am unable to describe what is in store for the people at large. The landholder and the ryot, the professional man and the man'of business, the village Banks and Loan offices are on the brink of ruin and they do not know what will turn up the next day. The material condition in other provinces is, I am afraid, equally, if not more, gloomy.

In holding this Exhibition, I am sure vour sole aim is to stimulate and encourage the growth of industries in the country and thereby to help in the betterment of the economic condition of the people. Exhibitions have their undoubted value in this direction. Though they possess this usefulness, I am afraid, there is a tendency to exaggerate it.

In the way in which exhibitions are held in every part of India in quick succession, I have begun to feel that without being a means to an end, an exhibition is perhaps considered to be an end in itself. It has been my good fortune to be present at many exhibitions during the last ten years and while I admire the organisation and the organisers I cannot but confess to a feeling of disappointment at the extent of industrial advance made within this time. The exhibits while good in themselves bring out in strong contrast what yet remains to be done. Except in the department of textiles, I regret to observe that not much has been attempted, still less accomplished. We are still dependent on foreign countries for many of the barest necessaries of life. The mechanical -and electrical industries are still in their infancy. While the world abroad is marching by rapid strides, we are almost where we stood fifty years ago. No doubt, want of political freedom explains a good deal but it is not the whole explanation. A swadeshi exhibition, therefore, fills my mind with gloomy thoughts and makes me not very optimistic about the industrial future of our country.

While I deplore the backward position of my country in the scale of manufacture, I cannot be blind to the condition of Europe and America to-day, which in their mad frenzy for production on large scale have brought unemployment and destitution to the masses of the people. Power production has revolutionised the industrial system in the west. It has displaced human labour in an inconceivable manner. In an annual report issued by the Commissioner of Labour Statistics, it was pointed out "'that American Power-machine production was then employing four million workers with an output that could not have been produced by fewer than twenty one millions in pre-machine times'". This circumstance holds good of other countries too in the west. The result, to quote Prof. F. Soddy, is that unemployment and trade depression threaten now whole classes of society. The iron law of natural scarcity has been broken but the spectres of poverty and destitution continue to haunt a world glutted with wealth and starvation of today is due, not to shortage but abundance".

Let me quote here one or two firsthand accounts of the heartrending miseries now prevailing in America. Says Mr. Fenner Brockway :

"If you want to see Capitalism in all its crazy confusion and cruelty, you must go to American.

You will see sky-scrapers built to the clouds, often as beautiful as they are big. Most of the rooms are empty. In their shadows you will find the unemployed living in chacks put together with bits of boxes, bits of motors, bits of cloth.

You will be held up in the street by a queue of luxurious motorcars, from which men and women, dazzlingly dressed, mount carpeted steps to attend a banquet and balls costing hundreds of pounds. Within a few yards you will find a long queue of men, old. middleaged, young, slouching slowly forward for a "hand-out" of bread.

You will find hotels which are a marvel of comfort and convenience—and costliness. For I5s, you can get a bed-room furnished like a palace, with private bath-room and shower-bath and lavatory, and a radio-set and telephone. Your suit will be pressed during the night, and in the morning you will be presented with a button-hole of flowers and a news-paper from your home town. In the same city thousands of un-employed sleep in municipal lodginghouses. their bunks-lining the walls, row above row. like goods packed in a warehouse.

You will cross the George Washington Bridge, over the Hudson, linking New York and New Jersey, and you will marvel at the delicacy of the lines of steel, as lovely as any Goethic cathedral. You will visit town after town and marvel just as much at the rows of hideous wooden huts in which the workers live.

Your train will take you through the wide agricultural expanses, and you will see corn and fruit and tomatoes and vegetables rotting because the farmers cannot sell them. In your paper you will read every day of men commiting suicide, because they cannot continue the battle against hunger.

Yon will travel for hours through the Southern States passing rows of bales of unsaleable cotton, mile after mile. Yon will hear the Detroit of 5000 children who have not clothes to wear to attend school."

A recent issue of *Statesman* gives this harrowing description of New York :—

"New York City, .scarcely three years ago at the peak of that glamorous prosperity of the post-war decade, is to-day grappling with an unemployment relief situation which, because of the large number of people affected and because of the uupreparedness of authority and industry to meet it, is without parallel in municipal administration.

Over a million of the city's inhabitants, representing one-third of the normal working population and one-sixth of the total population, are unemployed and dependent, where resources have come to an end. upon public and private charity. Including dependents, something like one-third of the[1] entire populace is in the shadow of unemployment."

At the present the number of the unemployed in Europe and America has been estimated at the appalling figure of thirty millions or three crores.

Our own experience in Bengal shows how starvation and abundance go hand in hand. In Bengal rice is selling at Rs. 1-4 a maund in the remotest villages, but the people who have to depend on manual labour for their living have not the means to buy it. I would, therefore, advise our countrymen to proceed with caution and not to neglect the cottage industries altogether. The disruption of village life brought about by the modern conditions of industry has wrought incalculable harm to the masses of the population. And it is certain that we cannot improve their lot by merely introducing the system of power production of the west.

Our Economic problem, as you have noticed, is thus hedged round with difficulties from all sides and you cannot expect a chemist to attempt to offer a solution. But I say this that our exhibitions must not overlook the supreme necessity of cottage industries while they feel the need of demonstrating the use ol machinery and of natural powers for the production of the" necessaries of life.

You are all familiar with the movement for introduction of Khaddar initiated by Mahatma Gandhi. The main object is to rehabilitate the defunct cottage industry in spinning and weaving and thereby improve the miserable condition of the masses of the people living in villages. The cult of Khaddar is the symbol of cottage industry by the pursuit of which family life and village life are not disintigrated and the evils of.factory labour may be avoided. I regret to say that the movement has not made that degree of progress which we all expect it should; nay it has received a set-back.

It is not within my scope to dilate on the general question of industrial development and I feel the Captains of industry, whom I see around, know much better than I do as to how to handle these big and difficult problems.

But I have one word to speak about the holding of Exhibitions. I suggest that there should be a well considered plan in this matter. At the present moment each province, whenever it chooses, organises an Exhibition and sometimes more than one Exhibition are held at one and the same time throughout India. In fact, some firms are faced with the tremendous difficulty of being simultaneously represented at half-a-dozen places in distant parts. This is a great handicap to the manufactureres. But the great drawback of this circumstance is that no Exhibition worth the name can achieve its main object. Like the Congress let an Exhibition be held in each province by-rotation and the other provinces than the one where it is held should work and help for its success. This Exhibition will be of a national character like the Indian National Congress. Provincial and District Exhibitions 'like the provincial and district Conferences may, if necessary, be organised but there should be one organisation which would be of an all India Character. It need not be held every year. This Exhibition must not be an adjunct of the Congress, for when it is so held it receives very scanty attention and all interest and enthusiasm are naturally centered on the political gathering.

Another matter which I would like to draw your attention to is the necessity of interprovincial fellowship and agreement in industrial and economic matters. In these days of Imperial Preference and Dominion pacts, may I suggest to you the question of Interprovincial understanding on the same lines. Why should not one province give preference to other provinces within India for raw products and manufactures, which the province does not produce within its own area? Let there be a sort of economic ring amongst the provinces and states of India. A political Federation is looming in the horizon. An Economic federation is also not out of place. This federation may not have the seal of Government sanction and authority. But like the Congress it may serve a very useful function and in course of time an Economic federation may come into existence. India is a continent by itself and with the prospect of autonomy for the provinces, a non-official interprovincial Economic link may be an instrument for the Economic well being of the whole country. I may cite examples when this want of interprovincial co-operation is bringing ruin and disaster to provinces. Gentlemen, I am not a politician nor an economist. I have gathered my ideas from practical experience. They may be unsound and unworkable when judged by the canons of political economy and political philosophy. I leave to our learned leaders to discuss the question in all its bearings.

I have my misgivings about provincial autonomy. It may give rise to inter-provincial Jealousy and if it does take place it will harm the Indian nationalist and help the foreign exploiter. While each province will no doubt, primarily seek the good of its own people, it ought at the sametime to help the people of other provinces, without injuring its own. That is why I plead for inter-provincial exhibition and inter-provincial economic pact if I may use the expression.

I would like, on an occasion like this, to raise my voice of protest against the modern craze for Luxury articles in preference to the fundamental needs for sustenance of life. The past war conditions in

America and England have been thus graphically described by a thoughtful writer—Prof. Seigfried :

"The requirements of the world to-day have greatly changed. The demand for prime necessities such as food and normal clothing has decreased, in favour of things to satisfy desires that are obviously of secondary importance, even pure nonsense. Essentials are being systematically relegated to the background, while everything for their leisure hours is much in demand. Luxury, or at any rate imitation luxury, is popular—everyone must have it. In the United States the French phrase, "de luxe", has become quite stereotyped. Ordinary clothing is superseded by fabrics considered more "deluxe"—less wool and cotton, but more silk, and ten times more artificial silk—so the cotton trade suffers in consequence. Meanwhile, a host of new expenses figure in everyone's budget, expenses suggested by-industries which seem almost to have sprung out of the blue, for twenty years ago they did not even exist. The world's consumption is now largely made up of an endless demand for automobiles, gramophones? radios, electrical gadgets, telephones, cinematographs, cameras, etc. * * * * This is evidently one by-product of the spread of democracy among the masses, who, weary of restraint, are at last insisting on having their share in the good things of life. By diminishing the general sense of responsibility and thrift and by suddenly revealing the profound unstability of our age, the War hastened this evolution of humanity towards immediate gratification. Asia and Africa are rapidly following in the wake of .America and Europe in this respect. * * * * * The progress of the American export trade in all the newer markets is based on the sale of motor cars, cinema films, electrical equipments, radios, typewriters, office equipment and calculating machines, sewing machines, household utensils, refrigerators, agricultural implements, road-making machinery, oil-drilling equipment, and so on. * * * * * for if they are to be fashionable they must not last too long."

To our great misfortune, these unfortunate tendencies are rapidly spreading even among the masses of our poor country.

Some of you will perhaps remember that in this city of Delhi Lord

Curzon administered a well-merited rebuke to our Indian Princes who would fain import carpets from Tottenham Court Road, London, and allow local manufacturers possessing hereditary skill and exquisite craftsmanship to languish for want of support and patronage. Only the other day Dr. Syed Ross Masood lamented this morbid outlandish taste of our fashionable men: "India", said he, "produces just as many beautiful things as Japan does ; but whereas in Japan the makers of beautiful articles are honoured as those enhancing the prestige of their country and the objects made by them are employed for beautifying homes, here in India we fill ours with cheap and ugly products of foreign countries and are ashamed even to mix on a footing of social equality with those that, happily for India, still continue to make those beautiful things for which she is even today renowned."

The cult of Swadeshi has taken its firm hold on the world at large. The example of Great Britain_ is_strongly in_vj.oinu_'.'Bay British" is the watchword of the British people-from the princes to the peasant. Every country is now preaching and practising Swadeshi with all its vigour and energy. Shall India alone lag behind ? I fervently appeal to my countrymen to be up and doing and shake off their lethargy and indolence. The world is moving fast and we cannot afford to sit idle and be the silent spectator of state of things abroad. I hope the spirit which has prompted you to hold the exhibition will lead you on to larger industrial and commercial exhibitions that will increase the wealth of the country and bring happiness and contentment to the millions of our people.

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* Address at the opening ceremony of the All India Industrial Exhibitions at Delhi March, 1, 1933.

Courtsey : P.C Ray Museum, Chem. Dept. C.U.

Drain of the Mineral Wealth of Bengal*

The partition of Bengal was annuled, it is true by Lord Hardinge, but the wound inflicted was not only not healed but has been fostering ever since. Some of her fairest and richest districts were lopped off the main trunk and grafted on to strange partners. The districts of Sylhet and Goalpara both of which are ethnologically and linguistically Bengali, have been tacked on to the Mongoloid Assam. Even as it is Assam has to depend on doles from the Central Government and minus the area indicated above Assam would not be able to stand on her legs for a single day. Then again Manbhum and portion of Singhbhum which were perhaps the only healthy places in this malaria-ridden province and which sheltered in their bosom some of the richest coal; mica and other mines have been made over to Bihar.[1]

The loss of the mineral wealth of a country can never be made good. One of the most important factors in the development of the resources of India is that relating to the working of her vast and in many cases untapped mineral wealth. The Report of the Indian Industrial Commission (1916-18) lays down elaborate suggestions as regards "concessions" and the acquisition of mineral rights and so forth, but is ominously silent on the most important point. Indians are hopelessly backward in industrial matters-they are far behind Europe and America in the modern metallurgical and technical education-they are lacking in co-operation and power of organisation; but that is no reason why the fullest advantage should be taken of their helplessness by foreign exploiters. The fact is overlooked that England holds India as a trustee and guardian and in a future age she will be called upon to render an account of her stewardship.

Our benign Government has already accepted in principle the imperative necessity of protecting the weak, ignorant and backward classees from the grasp of pettifogging sharpers and dishonest sowcars, e.g. by enacting the Encumbered Estates Act. The object evidently was to prevent their being sold out of their patrimony. Some such Act is urgently required for safeguarding our national patrimony.

After all, India is progressing and waking up and if her sons to-day are unable to work her own mines, their children or children's children will be able to do so. If in the meantime all the mining rights and concessions in Burma, and Assam and other provinces of India proper are leased out to foreign exploiters nothing will be left for furture generations. The late Mr. Gokhale often used to tell the present writer that the greatest injury which the British Government is inflicting upon this unhappy land-an injury which is beyond her powers of recuperation-is the slow but continuous exhaustion of her mineral wealth. As the *Statesman* put this point with great clearness :

"In the case of the mining industry, for instance, it (i.e., the development of the country's resources by English Capital) means not merely that the children of the soil must be content for the time being with the hired labourer's share of the wealth extracted, but that the exportation of the remainder involves a loss which can never be repaired. Though the blame largely rests with them, we can well understand the jealousy with which the people of the country regard the exhaustion, mainly for the benefit of the foreign capitalist, of wealth which can never, as in the case of agriculture, be reproduced. It is, in short, no mere foolish delusion, but an unquestionable economic truth, that every ounce of gold that leaves the country, so far as it is represented by no economic return, and a large percentage of the gold extracted by foreign capital is represented by no such return, implies permanent loss.

As we said in a previous article, the exploitation of the mineral resources of the counry by the foreign capitalist stands on a different footing; for, in this case the wealth extracted is not reproduced, and, on the not unreasonable assumption that it would sooner or later have been exploited with Indian capital, may unquestionably be said to deprive the people of the country, for all time, of a corresponding opportunity of profit.

Vide "G. V. Joshi's Writings and Speeches", pp. 954-55.

This may be illustrated by a single example. The total output of gold produced in Kolar mines since 1882, the 1st year of the operation, has ben about 15 million ounces, valued £65$^1/_2$ million i.e.. 100 crores (approximate) of rupees. The figures are from a statement placed before Lord Irwin when he visited the Kolar Gold mines in July, 1927. Of late years it has so happened that the value of the gold thus extracted from the mines occupying only one or two sqaure miles, has almost equalled the total revenue of the Mysore Stae, which is entitled to only 5 per cent of the output as royalty.

The rich coal mines worked by the English companies are mostly in the Samindaries of the Ghatwals (Lit. wardens of the marches) of Giridhi, Jheria, etc. They are as simple and unsophisticated as the African chiefs referred to in the next paragraph and their simplicity can thus be easily imposed upon. The mining rights and the concessions were often acquired for a song....the Salami or royalty being ridiculously small.

In Africa, inhabited by primitive peoples, the White man has not hesitated to stoop to methods "incredibly mean and unscrupulous". "The usual procedure was for the explorer or agent to penetrate some distance inland from the coast and induce the chiefs or kings by gifts of cloth or alcohol, to sing so-called treaties with the Joint-Stock Companies. According to the treaties, these African rulers, whose signature consists of a mark, ceded the whole of their territory to Joint-Stock Compaies for a few yards of cloth or a few bottles of gin.

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"When Dr. Peters induced an East African chief to make a mark on a piece of paper his territory passed into the hands of the 'Gesellschaft fur deutsche kolonisation', and thence into those of the German Reich; and when the agent of the National African Company, Limited, induced an emir to do the same in Nigeria, the sovereignty over his territory mysteriously passed to Queen Victoria as head of the British Empire." Woolf : *Imperialism and Civilization,* pp. 73-74.

According to the late member for Commerce and Industry, Sir William Clark, the building up of industries where the capital, control and management should be in the hands of Indians was the special object which we all have in view. He was particularly careful in pointing out that the development of Indian industries would not mean that "the manufacturer who now competes with you from a distance would transfer his activities to India and compete with you within your boundaries." His excellency the Viceroy in an address at the Calcutta University Convocation also laid particular stress upon this aspect. According to Lord Chelmsford, "We do not want mere Indian capital, we want Indian men and not Indian men only as labour but as leaders who will turn their attention to industrial enterprise and equip themselves for a great Industrial regeneration in India."

It is melancholoy to reflect that Viceroys and Governors of Province have often been lavish in giving expression to pious sentiments and altrustic motives; but these letters have never been translated into action : all the smae exploitation goes on galore. nd the future historian of India will have to write a dismal chapter indicating that when her people at last woke up they fond all the wealth in the bowels of the earth carried away by foreign exploiters and only empty dark caverns and subterrananean vauls and passages left behind.[2]

This chapter can be apprpriately closed with Herbert Spencer's advice to the Japanese statesman, Baron Kaneko, warning him against granting concessions of mines or of land to foreigners : "Respecting the future questions youask, let me, in the first place, answer generally that the Japanese policy should, I think, be that of *keeping Americans and Europeans as much as possible at arm's length.* In the presence of the more powerful races your positon is one of chronic danger, and you should take every precaution to give as little foothold as possible to foreigners.

"It seems to me that the only forms of intercourse which you may with advantage permit are those which are indispensable for the exchange of commodities and exchange of ideas–importation and exportation of physical and mental products. No further privileges should be allowed to people of other races, and especially to people of the more powerful races than is absolutely needful for the achievement of these ends. Apparently you are propsing by revision of the treaty powers with Europe and America 'to open the whole Empire to foreigners and foreign capital.' I regard this as a fatal policy. If you wish to see what is likely to happen, study the history of India. Once let one of the more powerful races gain a *point d'appui* and there will inevitably in course of time grow up an aggressive policy which will lead to collisions with the Japanese; these collisions will be represented as attacks by the Japanese which must be avenged; forces will be sent from America or Europe, as the case may be; a portion of territory will be seized and required to be made over as a foreign settlement; and from this there will grow eventually subjugation of the entire Japanese Empire. I believbe that you will have great difficulty in avoiding this fate in any case, but you will make the process easy if you allow any privileges to foreigners beyond those which I have indicated.

"In pursuance of the advice thus generally indicated, I should say, in answer to your first question, that ther should be, not only a prohibiton to foreign persons to hold property in land, but also a refusal to give them leases, and a permission only to reside as annual tenants.

"To the second question I should say decidedly, prohibit to foreigners the working of the mines owned or worked by Government. Here there would be obviously liable to arise grounds of difference between the Europeans or Americans who worked them and the Government, and these grounds of difference would immediatly become grounds of quarrel, and would be followed by invocations to the English or American Governments or others powers to send force to insist on whatever the European workers claimed, for always the habit here and elsewhere among the civilized proples is to believe what their agents or settlers abroad represent to them.

"In the third place, in pursuance of the policy I have indicated, you ought also to keep the coasting trade in your own hands and forbid foreigners to engage in it. This coasting trade is clearly not included in the requirement I have indicated as the sole to be recognised-a requirement to facilitate exportaton and importation of commodities. The distribution of commodities brought to Japan from other places may be properly left to the Japanese themselves, and should be denied to forigners, for the reason that again the various transactions involved would become so many doors open to quarrels and resulting aggressions.

David Duncan : *Life of Herbert Spencer,* pp. 321-22.

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1. Mr. J. Chowdhbury has recently written to the Amrita Bazar Patrika (June 19, 1930) very feelingly on this point :

"I was intimately associated with the movement for the annulment of the Partition of Bengal. When the partition was annulled, I and many of my colleagues, though welcoming the annulment felt very much aggrieved that the Presidency of Bengal though reconstituted on a linguistic basis, has left out of it large areas inhabited by Bengalee-speaking people. Our then political leader the late Surendra nath Banerjee advised us to accept the arrangements then made and assured us that in accordance with the promises held out by Lord Hardinge, both in his partition despatches and assurances, we would be entitled to have all the Bengalee-speaking areas brought within the Presidency of Bengal at a further readjustment of territory later on.

"A further reason for restoring these Bengalee-speaking areas to Bengal is that they are much healthier than the deltaic protion of Bengal. For the efficiency of public services it is very desirable that these parts should form a part of Bengal. People of Bengal of humbler means who suffer from Malaria or other epidemic diseases visit these parts periodically for recouping their health.

"It is, therefore, a grievous wrong to Bengal that the comparatively healthier parts of Bengal should have been carved out of the Presidency and annexed to the adjoining province of Behar, which is already a much healthier province.

'Since the Partition Agitation, Bengal has been in the bad books, of the Government of India. Although the Partition was annulled in 1912, Bengal has since then been crippled in many respects. The seat of the Government of India was transferred from Calcutta to Delhi. This has reduced the importance of this Presidency and the scope of employment of her people. Then the size of Bengal was reduced to that of the smallest amongst

Governor's provinces excepting Assam. The healthier parts of Bengal, rich in mineral resources were made over to Behar with which they had no linguistic or other affinity. (the italics are mine).

2. Vide an article, contributed by the author, in the *Modern Review,* March, 1919.

By the courtsey of Prafulla Chandra Roy's Museum, Science College, Chemistry Dept. of Calcutta University.

(Report of the Indian Industrial Commission, March, 1919 in Modern Review include in this volume.–Editor.)

Foundation of a Key Industry in India

Electrolytic Manufacture of Soda and Chlorine

One great difficulty in India of starting big industries is that she is called upon all of a sudden to face fierce competition from the long established, highly developed industrial organisations of Europe, America and Japan. Foreign prodeucts are dumped into the country at rates which defy competition and thereby indigenous industries are throttled out of existence. Needless to say, price are again enhanced after the local enterprise has been crushed out to make good for the temporary losses of the foreigner. The difficulty is now further increased when England herself, under the new constitution, in the name of Imperial preference or some other euphemistic epithet, is entering the field by jumping over the tariff wall. Just now this is our unfortunate positon. Gigantic British industries incorporated in England, such as the Imperial Chemical Industries Ltd., are opening branches in India. But if unhappy India is to exist at all she must be prepared, dwarf as she is, to fight with the colossal giant.

Hitherto in India only a single attempt has been made by Indians to start a big key industry, the Tata Iron and Steel Works Ltd. It has outlived its infancy and has come to adolescence. At the outset it had the financial backing of the late J. N. Tata and latterly of the Bombay capitalist. When the great war broke out and the supply of foreign steel was cut off, our government realised the supreme importance of an indigenous industry and of making India self-contained as far as possible in her needs. But the Tatas at that time behaved like spoilt children. Once while presiding over an industrial conference Sir Dorab Tata boasted that his expert was drawing a pay higher than that commanded by the Viceroy of India. The criterion of efficiency had thus been judged by the concern by the salary of its expert. Things went on merrily for a time, but, a crisis arose when peace was concluded and the efficiency of the experts was tested in the fire of foreign competition. German and Belgian steel produced from a much lower grade iron ore began to pour into the market at a much-reduced rate. A cry was raised for the support of an infant industry and a national backing was secured for the concern for its protection and subsidy. It is needless to proceed further. Suffice it to say that Tata Iron and Steel Works got something like a crore a year from the Imperial coffers and latterly under the Imperial preference somewhere nearabout eighty lakhs a year. In orhter words the poor peasantry of India were taxed for their commodities,such as corrugated sheets and implements of husbandry, and the country had to pay seven or eight crores of rupees to cover the losses of inefficient running of this concern. Still the cost is not too high if the concern thereby becomes efficient and completely Indiansed.

These preliminary remarks may seem irrelevant to many but they have an important bearing on the subject proper which I now introduce.

India is yet in her infancy in industrial progress and capital is naturally very shy and she lacks in organising power. Hence undertakings of colossal scale as obtain in highly developed industrial countries do not appeal to her and are at present beyond her means. Therefore the example set by an Asiatic coutry naturally appeals to her.

Japan has developed to a remarkable extent during the last decade in her industrial activities in diverse fields, following the example of European countries. In the metallurgical industries, such as, copper mining and copper refining, she started from a very small beginning; now she occupies practically the second place in world production. Last year in an article published in *The Electrical World*, Dugald Jackson, Emeritus Professor of Electrical Engineering of the Massachusetts Institute of Technology gave a survey of Japanese electrical plants. He states that practically all the power station both hydroelectric and thermal are now run by Japanese generators. The sizes of these generaters and their efficiency are quite on a par with those of other nations. Electric locomotives that run in Japan have all been manufactured in Japanese factories. A number of Japanese lamp factories have been started and the productive capacity of one of them could be compared favourabley with some of the biggest factories in the world, having a daily, output of three lakhs of lamps. In Electro-Chemica industries her development has been remarkable. By the electrolysis of common salt she not only supplies her need for alkalies and bleaching poweder and liquid chlorine but manages to export large quantities abroad at a price much lower than that produced by other nations. She produces the artificial fertilisers needed for her agriculture by the atmospheric fixation of nitrogen and even exports considerable quantities abroad. Though she lacks in aluminous one which is imported mainly from our country, she has within the last six years develop a big Aluminium industry. Her textile industry, silk industry, rayon industry, rubber industry have developed within the last decade to such an extent that they excite the envy of people who had been pioneers in those and have considerable experience.

The secret of these undertakings in their inception and growth may be attributed to many causes, but it may be pointed out that she is now almost independent of foreign manufacturers regardeing the equipment of her industrial concerns. Japan now is in a position to equip almost all her factories with machinery and equipments developed in Japan and a considerable number of them are of higher efficiencies than those developed abroad. This is the finding of an eminent foreign engineer, a teacher of a renowned engineering institution and no mean observer in the world progress in the engineering line.

Japan has to import pig iron and scrap iron from India; she readily converts them into steel and now her grand mercantile marine and her powerful naval equipment including battleships, cruisers and submarines, aeroplanes for commercial navigation and warlike operations and all the ingredients for war purposes are secured from the steel of her own making. The textile machinery is entirely of her own production. The development of the rubber trade and of the rubber products both in variety and in price has been remarkable. One really looks for the basic factors which have led to this astounding progress and one finds that spirit of self-determination and self-confidence to produce the elements of her industrial equipments independent of foreign countries form the foundation of her industries.

Things are different here in India. One can cite the case of sugar industry. Thanks to the prohibitive duty of Java sugar we have had a rapid growing up of an indigenous sugar industry. Already there is over-producton and rate cutting and loud complaint against the excise duty on home-grown sugar.

Here is an example of the effects on the considered excessive protective duty. But the important fact must not be overlooked. Any one who examines the custom duties on imported machineries will be surprised at the enormous quantity of machinery worth several crores introducted into our country from abroad, from England, the continent of Europe and the States.

This comparison would surely indicate the secret of Japan in a nutshell. As soon as her period of probationership was over, she with commendable foresight turned a new leaf in her chapter of industry. She realised that she must manufacture on the spot her own requirements and has managed the same on an economic basis. She is no longer dependent on foreign countries. She charges wages for labour from a coolie to an expert in a scale which would puzzle us. She is a rice-eating nation like ourselves and her cost of living is not of the standard of European countries. An expert technician or a college professor serves on a pay which appear to us ridiculously small. But unlike us she takes advantage of her asset of brain and brawn for her own benefit. There is no tendency for job hunting and service securing in Japanese youths. While we are frittering our energies in securing paper qualifications without any definite end in view, thus running to waste our potential brain wealth, Japan had been utilising to the fullest extent her intellectual elements for the development of her industries, her commerce and other avocations of modern national life. Though in the beginning she like other oriental countries had been stunned by the force of impact of science of society, she rallied quickly and set up an organisation to equip herself to meet the altered conditions. And further her government gave well-planned and highly efficient financial and technical backing to her enterprises during their infancy.

In explaining the industrial growth of Japan we have diverged from our main them rearding the difficulties new industries in our country. It is well known that there are a number of industries which are essential for the development and growth of other industires. Of these key industires one finds alkali manufacture has an unique positon. Soap has been stated by Liebig to be an index of modern civilised society and though India situated in the tropics abounds in vegetable oil and has within the last twently five years grown an indigenous soap industry in may be pointed out that she is entirely dependent on imported alkalies for the same. The quality and price of soap are naturally found to be affected by the fluctuations in the price of this imported alkali. Within the last forty years India has been growing a textile industry mainly for her home consumption and it is not realised how far the industry is dependent on the imported alkali. The growth of an Indian paper industry, apart from other causes, is handicapped not to an inconsiderable extent due to cheap alkali. In a modern paper mill established in the neighbourhood of Calcutta we have the information that the annual consumption of alkali runs up to about 3,000 tons a year. These are only a few examples to illustrate the nature of this key industry. Alkali manufacture can be traced back to very olden times, but the modern methods can be said to originate from the processes will known to students of chemistry—the Leblane and Solvay processes,—about the beginning of the last century. With the development of electrical energy the electro-chemical decomposition of sodium chloride to produce caustic soda, chlorine and hydrogen has been evolved and within a short period of twenty years the long established older processes have received a check. In America specially, the electro-chemical process soon supplanted to a considerable extent the older industries. More particularly, since then its bye-product chlorine, transformed either into bleaching powder or into liquid chlorine, is finding considerable use for disinfection and other sanitary purposes.

As we discussed about the industrial development of Japan we found that her secret of success lay in devising means to build up her own equipments without external aid. For some time there has been an attempt to design a suitable electro-chemical plant for the production of alkalies and bleaching powder locally and it may now be said that there is every change of installing a successful plant for the purpose. For more than a couple of years the untiring effort of a band of workers, who for reasons beat known to them do not like to give their names away to the public, had been engaged in the problem and they feel that the successful establishment of this important key industry may not be very far off. The experimental plant is a very modest one with a small output but it shows signs that it is capable of large expansions. It has as its competitor one of the biggest world organisations namely, the Imperial Chemical Industries, subsidised by the British Parliament, opening its new branch here, but there is reason to believe that India has a scope not only for such big organisations, but also for small ones. If the spirit of self-confidence, self-sacrifice and effciency in organisation can be combined such small concerns may not lose heart to face the competition. In these days of motor lorries and quick transport, even in the streets of big metropolis hand carts have not ceased to ply their trade. But apart from plain and honest competiton, there are other methods of killing an infant industry practised here, chiefly by foreign concerns, or "Indian" concerns that are "Indian" only in the location of their industrial machinery. Zonal price cutting, threats to purchasers or wholesalers of non-supply by the European concerns, if they purchase from Indian concerns, and similar octopus methods of strangling infant Indian industries are practised here with impunity. Such practices must be regarded as criminal and penalised. The foreigners have stipulated and obtained their safeguards. It is up to us to agitate for and secure anti-trust laws and other safeguards against the destroyers of Indian enterprise.

The dawn of a new era in the industrial development of India would certainly begin when this and other important key industries take their footing in the indigenous soil and be entirely developed by us unaided by extraneous help.

Source : The Modern Review, Aug. 1938, pp. 209-211.

Report of the Indian Industrial Commission

It is not my purpose to go in detail over the Report of the Indian Industrial Commission. I shall confine myself to a few salient points.

It is fortunate that the main object of appointing the Commission has been explained in no equivocal terms by Sir William Clark. According to the late member for Commerce and Industry, the building up of industries where the capital, control and management should be in the hands of Indians was the special object which we all have in view. He was particularly careful in pointing out that the development of Indian industries would not mean that "the manufacturer who now compete with you from a distance would transfer his activities to India and compete with you within your boundaries." His excellency the Viceory in his address at the Calcutta University Convocation the other day also laid particular stress upon its aspect. According to Lord Chelmsford, "We do not want mere Indian capital, we want Indian men and not Indian men only as labour but as leaders who will turn their attention to industrial enterprise and equip themselves for a great Industrial regeneration in India."

It is thus evident that the declared policy of the Government of India is decidedly against the *exploitation* of Indian minerals and her almost inexhaustible resources of raw materials by foreigners, be they British, American, or German.

It is necessary to pause here for a moment to discuss some of the potent causes which have conspired to bring about the ruin and even extinction of the staple Indian industries. The East has been immobile, inert and conservative to the core for centuries. In a manner she was living in peace and repose dreaming dreams or absorbed in meditations on the essence of the Supreme Being. Every village with the graduated hierarchy of the caste regulations was an ideal republic. There was the village artisan and the smith—the barber, the washerman, the priest—the landlord, the tenantcultivator—the weaver and the small trader and so forth—each doing his allotted duty. But contact with the mobile, progressive and energetic west changed all that. At barely a moment's notice India found herself confronted with a formidable rival. She must run at railway speed or she lost forever, and thus came a tremendous crash and the collapse of her industries. Here again, Nemesis overtook unhappy India. What was once an apparent source of strength now became the weak point in her armour–I mean the pernicious caste system. As I have said elsewhere :

The caste system was established *de novo* in a more rigid form. The drift of Manu and of later Puranas is in the direction of glorifying the priestly class, which set up most arrogant and outragenous pretensions. According to Susruta, the dissecion of dead bodies is a *sine qua non* to the student of surgery and this high authority lays particular stress on knowledge gained from experiment and observation. But Manu would have none of it. The very touch of a corpse, according to Manu, is enough to bring contamination to the sacred person of a Brahmin. Thus we find that shortly after the time of Vagbhata, the handling of a lancet was discouraged and Anatomy and Surgery fell into disuse and became to all intents and purposes lost sciences to the Hindus. It was considered equally undignified to seat away at the forge like a Cyclops. Hence the cultivation of the *Kalas* by the more refined classes of Society, of which we get such vivid pictures in ancient Sanskrit literature, survives only in traditions since a very long time past.

The arts being thus relegated to the low castes and the professions made hereditary, a certain degree of fineness, delicacy, and deftness in manipulation was no doubt secured but this was done at a terrible cost. The intellectual portion of the community being thus withdrawn from active participation in the arts, the how and why of phenomena–the co-ordination of cause and effect–were lost sight of–the spirit of enquiry gradually died out among a nation naturally prone to speculation and metaphysical subtleties and India for once bade adieu to experimental and inductive sciences. Her soil was rendered morally unfit for the birth of a Boyle, a Des Cartes, or a Newton and her very name was all but expunged from the map of the scientific world.[1]

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[1] History of Hindu Chemistry.

That the exclusive monopoly of privileges by the higher castes ends in the long run in their moral and intellectual deterioration is almost the burden of President Wilson's campaign speeches. We can make room for only one or two short extracts :

"The nations are renewed from the bottom, not from the top; that the genius which springs up from the ranks of unknown men is the genius which renews the yough and energy of the people...A nation is as great and only as great, as her rank and file."

Again,

"It is on of the glories of our land that nobody is able to predict from what family, from what region, from what race, even the leaders of the country are going to come."—*The New Freedom.*

The invention of the steam engine by Watt in 1766 brought about an economic revolution from the effect, of which India has suffered most, since it was followed up by or rather was contemporaneous with three successive inventions in twelve years, that of the spinning jenny in 1764 by the *weaver* Hargreaves, of the spinning machine in 1768 by the *barber* Arkwright, of the "mule" by the *weaver* Crompton in 1776. The mischievous and suicidal effects of the caste-system now began to operate. Almost from the Vedic ages the blacksmith, the weaver and the various classes of artisans have remained much the same in this land of stagnation and torpor; they have failed to advance *pari passu* with progressive Europe and with their primitive methods had to succumb to the competition of the culters of Sheffield and the weavers and spinner of Lancashire, who, not having had the handicap and disadvantage of following a hereditary calling, could always recruit new blood and bring in or invite new ideas and originality. The Brahmancial and other high castes have always disdained to do manual work, with the result that they have been fit only for literary and clerical pursuits. No wonder that our *intelligentsia* should fail to develop a right tradition of industrialism.

The ruin and downfall of Indian industries was further hastened by the selfish policy of British statesmen, who by the imposition of prohibitive duties protected the British manufacturer and who began to look upon the vast continent as a field for the supply of raw material required by them. It is a happy sign of the times that both the Government and the people are now realising the critical situation we are in and have been devising means to avert the disaster in which we have been landed; but the efforts which have been hitherto made in this direction are fitful and spasmodic and no continuity in the policy is discernible. But the most fatal mistake–a mistake which now almost borders upon a political crime–has been the hostile attitude of the Government towards elementary mass education. There is a saying in Bengali that it is folly to cut at the root of a tree and at the same time to water its top branches. Thus we read : "There is no doubt a great deal of scope for improvement. The average yield for India is 98 Ibs, of ginned coton per acre; while the figures for America and Egypt are 200 Ibs. and 450 Ibs, respectively. The fluctuations in the field of *gur* are equally striking. Thus in the irrigated area of the N. W. Frontier Province it is two tons peracre while in Assam it is only 0.9. The Agricultural Department of Bombay, however, by the proper application of water and manure, has secured an yield of six tons per acre. Mr. Fletcher, Imperial antomologist, adds his valuable testimony to the effect that the annual dammge by crop-pests cannot be placed at less than five thousand lakhs of rupees." On his ground he advises the Government of India to follow in the wake of Canada, which has got an Entomological Service, having for its aim : first, the prevention of the introduction and spread of injurious insects; second, the investigation of insect pests affecting agriculture, horticulture, forstry, and the health of domestic animals and man; and third, the imparting of the information so obtained to those interested and concerned by means of bulletins, circulars, press notices, addresses, letters, and personal visits neutrality and allow us to settle our account as best as we coutd, but going further they did all they could to help the foreign competitor as agasint us in various ways by adopting Free Trade Measures by pursuing Railway extcusions by making grants of special privileges to foreign enterprises etc–"G V Joshis writings & speeches p. 786. For these purposes there exists of Ottaw and at the various field laboratories throughout the country a staff of men of such scientific training and ability as will enable them to make the service of the greates benefit to the people of Canada. Mr. Flectcher, therefore, puts in a vigorous plea for the establishment of a Central Entomological Research Institute which would cost rougfhly fourteen lakhs non recurring and four and a half lakhs recurring when the scheme was in full working order.

Similarly we have already got an Agricultural Research Institute at Pusa, with all its paraphernalia of expensive machinery and the "Imperial"and "Provincial" Services.

But we always begin at the wrong end. I should be the last person to disparage the necessity for scientific research. The simple fact is, however, overlooked that our agricultural population, steeped in ignorance and illiteracy and owning only small plots and scattered holdings, are not in a position to take advantage of or utilise the elaborate scientific researches which lie entombed in the bulletins and transactions of these Institutes. Mr. Mackenna very rightly observes : "The Famine Commissioners, so long ago as 1880, expressed the view that no general advance in the agricultural system can be expected until the rural population had been so educated as to enable them to take a practical interest in agricultural progress and reform. These views were confirmed by the Agricultural Conference of 1888....The most important, and probably the soundest proposition laid down by the conference was that it was most desirable to extend primary education amongst agricultural classes. Such small countries as Denmarks, Holland and Belguim are in a position to send immense supplies of cheese, butter, egges, etc, to England, because the farmers there are highly advanced in general enlightenment and technical education and are thus in a position to prifit by the researches of experts. The peasant proprietors of France are equally fortunate in this respect; over and above the abundant harvest of cereals they grow vine and oranges, and have been highly successful in sericulture; while the silk industry in its very cradle, so to speak, namely, Murshidabad and Malda, is languishing and is in a moribund condition.

Various forms of cattle-plague, e.g., rinder-pest, foot-and mouth-disease, make havoc of our cattle every year and the ignorant masses, steeped in superstitions look helplessly on and ascribe the visitntious to the wrath of the goddess *Sitala.* It is useless to dig Pastcur's researches into their ear. As I have said above, our Government has the happy knack of beginning at the wrong end. An ignorant people and a costly machinery of scientific experts ill go together.

The panacea recommended for the cure and treatment of all these ills is the foundation or re-organisation of costly bureaus and Scientific and Technical Services, the latter with the differentiation of "Imperial" and "Provincial" Services, which are in reality hot-beds for breeding racial antipathies and "sedition." For the recruitment of the Scientific Services the Commissioners coolly propose that not only "senior and experience men" should be obtained from England but that "recruits for these services—especially chemical services—should be obtained at as ealry an age as possible, preferably not exceeding 25 years." What lamentable ignorance the Commissioners betrary and what poor conception they have of this vital question is further evident from what they say :

"We should thus secure the University graduate, who had done one or perhaps two years' post-graduate work, whether scientific or practical, but would not yet be confirmed in specialisation. We assume that the requisite degree of specialisation will he secured by adopting a system whereby study leave will be granted at some suitable time after three years' service, when a scientific officer should have developed a distinct bent."

In orther words, secure a dark horse and wait till he develops a distinct bent! The writer of this article naturally feels a little at home on this subject and it is only necessary to cite a few instance to illustrate how under the proposed scheme Indians will fare. At the present moment there are four young Indian Doctors of Science of British universities, three belonging to that of London. Two of them only have been able to secure Government appointments, but these only temporary, drawing two-thirds of the grade pay. One has already given up his post in disgut, because he could get no assurance that the post would be made permanent. In fact, both of them have been given distinctly to understand that as soon as the war conditions are over, permanent incumbents for these posts will be recruited at "home". In filling up the posts of the so-called experts one very important factor is overlooked. As a rule only third rate men care to come out to India. The choice lies between the best brains of India and the mediocres of England, and yet the former get but scant consideration and justice. It may be urged that these gentlemen had not their cases represented at the India Office. The answer may be given in the eloquent words of the late Mr. A. M. Bose :

"Not that they did not try to get appointed in England. No. gentlemen, after taking their degrees in the great English and Scotch Universities, after having won all their high distinctions–distinctions not less high than those of their English brethren in the service, in some cases perhaps even higher–they tried their very best, they made what I may almost describe as frantic efforts at the India Office to get an appointment from England. But all their efforts were in vain. After waiting and waiting and after heart-rending suspense, they were told that they must ship themselves off, as soon as they could, to India for the Government to appoint them there."

The creation of so many Scientific "Imperial" Services means practically so many close preserves for Europens.

There is another strong reason in favour of employing Indian agency, as has been pointed out elsewhere :

"A European naturally looks to India as a land of exile and his thoughts are always turned homeward. As soon as he joins his appointment, he begins to look forward to his furlough and even during summer holidays he often runs home. Socially speaking, the European lives quite apart and it is only in rare cases that he is found to mix on equal terms with his pupils. The result is that he fails to create anything like an intellectual atmosphere.

"Moreover, the European when he retires from the service leaves India for good and all the experience which he gathered during his service of office are clean lost to the country. But the mature experience of an Indian after retirement are always at the disposal of his countrymen; he is in fact a valuable national asset."*

The case from the Indian point of view has been so ably put by Mr. Malaviya that it need not be further discussed. One painful reflection, however, oppresses the writer. That three Indian members of the Commission in their sober senses could make up their minds to affix their signatures to this portion of the Reprot is what surpasses his understanding. It never evil dently occurred to them that they were committing themselves to the scientific suicide of India.**

The Indianisation of the Scientific Services has become a paramount necessity, not only because it would afford scope for the play of the Indian brain, but also in the interests of economy itself. The claims of the dumb millions, who after all are the real tax-payers, have hither to been systematically ignored. The primary education bill of Gokhale was shelved because of the prohibitive expenditure it would have involved. On similar grounds santitation and drainage schemes are postponed to the Greek calends. The revenues of India are of an inelastic nature. If we are to find money for these crying needs it must be done by the utilisation of indigenous agency. When the Reform Scheme is given effect to, a large number of Indian members will naturally occupy places both in the Provincial and Imperial Execurtive Councils. If, however, the present princely and exhorbitant scale of pay were to be retained all along the line, the result would be simply ruinous. The poor ryot would then be justified in saying that what his educated and favoured compatriot was clamouring for was not so much the welfare of the land as the division of the spoils–the share of the loaves and fishes.

The most essential and vital aspect of the Industrial Commission must not be overlooked. The policy to which the Government of India is committed is foreshadowed in the following extract from Lord Hardinge's Despatch to the Secretary of State, dated the 26th November, 1915 :

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* Vide Memorandum Submitted before the Public Services Commission by Dr. P. C. Ray–Essays & Discoures : p.166.

** With the notable exception of Pandit Madan Mohan Malaviya, whose note is really the most important portion of the Report. All Honour to this patriolic son of India.

"It is becoming increasingly clear that a definite and self-conscious policy of improving the industrial capabilities of India will have to be pursued after the war, unless she is to become more and more a dumping ground for the manufactures of foreign nations who will be competing the more keenly for markets, the more it becomes apparent that the political future of the large nations depends on their economic position. The attitude of the Indian public towards this important question is unanimous and cannot be left out of account. Manufactures, politicians and the literate public have for long been pressing their demands for a definite and accepted policy of State aid to Indian industries: and the demand is one which evokes the sympathy of all classes of Indian whose position or intelligence leads them to take any degree of interest in such matters. After the war India will consider herself entitled to demand the utmost help which her Government can afford to enable her to take her place, so far as circumstances permit, as a manufacturing country."

The after-war problems have not to be tackled, but a most serious situation now arises owing to the unpreparendness of India. The war has proved to be a veritable God-send to Japan and she has taken the fullest advantage of the psychological moment. Japanese goods have flooded the Indian market. In our utter helplessness we have only to be passive onlookers and realise our absolute dependence upon foreign countries for the supply of manufactured articles and finished products most of which could be easily prepared at home; but here a most difficult and delicate problem has to be grappled with. Indications are not wanting which go to show which way the wind is blowing. Already some powerful British companies have been started or promoted, with huge capital and gigantic resources at their back, and every patriotic Indian who has learned to think for himself is naturally filled with dismay and consternation. Within the last few years, in and about Calcutta, a few Swadeshi industries have sprung up, which after gasping for breath in the infant stage have arrived at the period of adolescence. But their very existence is now at stake and in fact they are threatened with extinction. Remember, again, these indigenous enterprises never sought the help of any special legislation nor asked for or obtained any pecuniary help from the State. To mention only one instance. 'Messrs. Cooper and Allen started the Government Boot and Army Equiptment Factory and, at the outset, *they received a considerable amount of financial assistance from Government.*" (Indian Industrial Commission's Report, Appendices,p. 56.) The italics are ours. In market contrast with it the National Tannery of Sir Nilratan Sircar may be mentioned. This noble and patriotic son of Bengal has not only devoted his valuable time and energy but has also risked his fortune for the cause. It is urged that it is one of the redeeming characteristics of the British Government that it grants equal opportunities and facilities to all and in such matters it holds the scale of justice even. This is true, but only in a qualified sense. It is not orious that the poor ryot when he finds himself pitted against his wealthy zamindar is simply ruined. The former is harrassed from one law-court to another and where as he can barely secure the services of a petty mukhtear, his formidable opponent can engage cousel at a fee of Rs. 1,000 per diem, if necessary. This is justice and fairplay with a vengeance! We are theatened with this kind of warfare in the industrial world. The British and American capitalists, with their centuries of experience, marvellous powers of organisatin and co-operation and elaborate machinery, and almost unlimited command of capital, have already appeared on the scene and their Indian competitors will naturally go to the wall. President Wilson has sounded the note of alarm in his own contry in no uncertain voice. "To-day if a man enters certain fields." says he, "there are organisations which will use means against him that will prevent his building up a business which they do not want to have built up; organisations that will see to it that the ground is cut from under him and the markets shut against him... American enterprise is not free; the man with only a little capital is finding it harder to get into the field and more and more impossible to comete with the big fellow. Why? Because the laws of this country do not prevent the strong from crushing the weak." If this is the state of things when the competition is American vs. American, we can easily gather how the Indian will fare in his competition with the American and British syndicates and combines and trusts. Let me adduce a concrete specific instance to illustrate my point. Twelve years ago a small venture was undertaken, which was purely of the nature of a pioneering demonsration experiment. A company was flated to enable our struggling and starving young men to have an oppourtunity of taking part in inland nagivation., A steam launch was purehased and it began to play in a narrow river, the upper regions of which are getting silted up. As soon as it was discovered that the business was a paying one, a powerful British company sent a couple of big steamers and reduced the original fare of one rupee from terminus to terminus to one anna, so that the Swadeshi company might be crushed out of existence. As the latter had still the herdihood to persist in this desperate game, the former sent an additional steamer and the fiat went forth, *delenda est Carthago*. Thanks to the self-sacrificing seal and patriotism of a medical practitioner and a local zemindar, the Swadeshi compny somehow or other manages still to strive. It is not, however, necessary to state here to what extent it has been affected financially all this time or to pause to inquire by how much the present writer, a "patron" of the undertaking, poor schoolmaster as he is, suffered in pocket. Yet the Industrial Commission Report expresses the pions hope that "there is no reason why India should not be ready to man her own ships when they are built."

Even when a Swadeshi concern is once started after overcoming immense difficulties in the initial stages, serious obstacles have to be encountered in the matter of marketing the products or the output of its factory. The damaging evidence of Mr. Adamjee Peerbhoy of Bombay, which for obvious reasons the President of the Commission wanted to be heard in camera, but which has leaked out, goes to prove, what is, however, notorious, that the Heads of the big purchasing departments show but scant consideration to the claims of Indians when there are British competitors in the field–it is but natural that they should fraternise with their own countrymen. The excellent intentions of the Government as embodies in Resolutions with sonorous periods get whittled down to precius little in filtering through the official strata.

One of the most important factors in the development of the resources of India is that relating to the working of her vast and in many cases untapped minural wealth. The Report lays down elaborate the acquisition of mineral rights and so forth, but is ominously silent on the most important point. Indians are hopelessly backward in industrial matters–they are far behind Europe and America in the modern metallurgical and technical education–they are lacking in co-operation and power of organisation; but that is no reason why the fullest advantage should be taken of their helplessness by foreign exploiters. The fact is overlooked that England holds India as a trustee and guardian and in a future age she will be called upon to render an account of her stewardship.

Our benign Government has already accepted in principle the imperative necessity of protecting the weak, ignorant and backward classes from the grasp of pettifogging sharpers and dishonest sowcars, e.g., by enacting the Encumbered Estates Act. The object evidently was to prevent their being sold out of their partimony. Some such Act is urgently required for safeguarding our national patrimony.

After all, India is progressing and waking up and if her sons today are unable to work her own mines, their children or children's children will be able to do so. If in the meantime al the mining rights and concessions in Burma, and Assam and other provinces of Indian proper are leased out to foreign exploiters nothing will beleft for future generations. The late Mr. Gokhale often used to tell the present writer that the greatest injury which the British Government is inflicting upon this unhapply land–an injury which isbeyond her powers of recuperation–is the slow but continuous exhaustion of her mineral wealth. As the Statesman put this point with great clearness :

"In the case of the mining industry, for instance, it (i.e. the development of the country's resources by English Capital) means not merely that the children of the soil must be content for the time being with the hired labourer's share of the wealth extracted, but that the exportation of the remainder involves a loss which can never be repaired. Though the blame largely rests with them, we can well understand the jealusly with which the people of the country regard the exhaustion, mainly for the benefit of the foreign capitalist, of weatlh which can never, as in the case of agriculture, be reproduced. It is, in short, no mere foolish delusion, but an unquestionable economic truth, that every ounce of gold that leaves the country, so far as it is represented by no economic return, and a large percentage of the gold extracted by foreign capital is represented by no such return, implies permanent loss.

As we said in a previous article, the exploitation of the mineral resources of the country by the foreign capitalist stands on a different fooring; for, in this case the wealth extracted is not reproduced, and, on the not unreasonable assumption that it would sooner or later have been exploited with Indian capital, may unquestionably be said to deprive the people of the country, for all time, of a corresponding opportunity of profit.

Vide "G.V. Joshi's Writings and Speeches," pp. 954-55.

The future historian of India will have to write a dismal chapter indicating that when her people at last woke up they found all the wealth in the bowels of the earth carried away by foreign exploiters and only empty dark caverns and subterranean vaults and passages left behind.

It is not necessary to proceed further. The future of industrial India is gloomy indeed. Happily there is a silver lining in the dark cloud.

Sir W. Clark, as have already seen, fully alive to the danger of the situation, was careful to point out that industrial progress did not "merely mean that the manufacturer who now competes with you from a distance would transfer his activities to India and compete with you within your boundaries;" and successive Governor General have given distinct pledges that every effort will be made to enable Indians to have a fresh start. The task will be a tremendously difficult one in view of the clamorous opposition of powerful interested parties. A Viceroy of India, close upon half-a-century ago, in his attempt to do justice to the people entrusted to his care, was confronted with the determined hostility of his countrymen out here and in his bitter anguish exclaimed : "Millions [out of the revenues of India] have been spent on the conquering race, which might have been spent in enriching and elevating the children of the soil.... It is impossible, unless we spend less on "interests"–and more on the people... The welfare of the people of India is our primary object. If we are not here for their good, we should not be here at all.'* Noble words, nobly uttered.

President Wilson in commending the League of Nations' covenant for acceptance observes : "We are done with annexations of helpless people. In all cases of this sort it shall be the duty of the League to see that nations assigned as tutors, advisers and directors of those people shall look to their interest and development before the interests and material desires of the mandatory nation itself.... Under their tutelage the helpless peoples of the word will come into a new light and a new hope." If, however, the exploitation of India goes on at this rate, England will be giving the lie direct to the noble ideal and aspirations breathed above. Recent events have, however, shown that British statesmanship can take courage in one hand and justice in the other; it is to be hoped it will prove equal to the occasion.

Postscript.–Since the above was in type, I have learned with sorrow that one of the three principal Swadeshi industrial concerns of Calcutta, which was hitherto regarded as a pride of Bengal, is threatened with extinction, so far as its swadeshi character is concerned. I mean the Calcutta Pottery Works. It is not necessary here to recount with what zeal, sacrifice and singleness of purpose, combined with expert knownledge, Mr. Satyasunder Dev helped the undertaking and made it a successful concern. In fact it might be said that the very cement of its kilns and furnaces represents the life-blood of Mr. Dev. A powerful British compnay, partly with threats of overwhelming competition and partly with the offer of a rich bait, has succeeded in practically buying it out. I understand the negotiations have been already completed. This regrettable affair is a sad commentary and reflection on the intelligence and patriotism of Maharaja Sir Manindra Chandra Nundy Bahadur and Rai Baikunthanath Sen Bahadur, the proprietors of the factory, who are both wealthy men. Alas! Even such men could be prevailed upon to part with their heritage for a handful of silver.

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* The Earl of Mayo.

The fate of the other two concerns referred to above is also trembling in the balance. If this is an earnest of what bids fair to becme of "a self-contained India," she will soon be reduced to the position of a "human cattle-farm" and a plantation, with her people as coolie and "Babu" labourers; and the "Industrial Commission" had better be called "Foreign Exploitation Commission."

The Modern Review, March, 1919 pp-222-229.

New Chemical Laboratory, Mercurous Nitrite and History of Hindu Chemistry*

The article represents portions of Chapter VIII, bearing the same title as above, of the remarkable book 'Life and Experiences of a Bengali Chemist', an autobiography of Prafulla Chandra Ray. It was published in 1932 by Chuckervertty, Chatterjee & Co, Ltd, Calcutta. The book was dedicated to 'The Youth of India' and in it's Preface Prafulla Chandra said : *'While a student at Edinburgh I found to my regret that every civilized country including Japan was adding to the world's stock of knowledge but unhappy that India was lagging behind. I dreamt a dream that, God willing, a time would come when she too would contribute her quota. Half-a-century has since then rolled by. My dream I have now the gratification of finding fairly materialized. A new era has evidently dawned upon India. Her sons have taken kindly to the zealous pursuit of different branches of Science. May the torch thus kindled burn with greater brilliance from generation to generation!'*

The chemical department of the Presidency College, located in the old one-storey building, was now proving quite inadequate to meet the increased demands made upon it. Although practical work for the F.A. in chemistry was not yet compulsory, the number of students choosing this subject for the B.A. and M.A. courses was increasing year after year. There were no flues for drawing off the noxious gases and the ventilating arrangements were most rudimentary; in fact while the practical classes were in full swing, the atmosphere, especially in the rainy season, thickly laden with fumes, became suffocating and highly injurious to health.

On one such occasion I invited Principal Tawney to go around the laboratory and breathe the air for a few minutes. Tawney, who, I believe, suffered constitutionally from weak lungs, after being in for a couple of minutes became terribly agitated and rushed out of the room and fulminated in a letter to the Director of Public Instruction against the state of things. He pointed out that if the Health Officer would come to know of it, he would be justified in prosecuting the authorities of the college for endangering the health of the students.

We soon learned to our delight that the Government had sanctioned and approved the plan [of a new building] submitted to it. I had a copy of the reprint of the description of the Edinburgh University's new chemical laboratory, containing drawings and diagrams illustrating the students' working benches, the reagent shelves, the ventilating flues, etc., and some of these were incorporated into our new plan.

We moved to the new buildings at the beginning of the session, July 1894. It soon began to attract visitors from different parts of India and by a curious coincidence my renewed and redoubled activity in the field of chemical researches dates from this eventful year. I had taken up the analysis of certain rare Indian minerals, in the expectation that one or two new elements might turn up and thus fill up the gap in Mendeleeff's Periodic System. Mr. (now Sir Thomas) Holland, then a junior officer in the Geological Survey of India and also a lecturer in Geology, Presidency College, kindly undertook to supply me with specimens of such minerals. I made some progress [in mineral analysis] when my chemical career underwent an unexpected turn.

The discovery of mercurous nitrite opened a new chapter in my life. The circumstances which led to it are thus described in the opening paragraph of the first communication on the subject. "Having recently had occasion to prepare mercurous nitrate in quantity by the action of dilute acid [nitric acid] in the cold mercury, I was rather struck by the appearance of a yellow crystalline deposit. At first sight it was taken to be a basic salt, but the formation of such a salt in a strongly acid solution was contrary to ordinary experience. A preliminary test proved it, however, to be at once a mercurous salt as well as a nitrite. The interesting compound thus promised to amply repay an investigation." *Journal of Asiatic Society* (Bengal), 1896.

It is not necessary to give here anything like a detailed enumeration of the investigations on mercurous nitrite and its numerous derivatives as also on the nitrites in general, as they form the subject-matter of some one hundred and more communications to chemical journals.

As one new compound followed in the wake of another, I took up their examination with unabated zeal. In short, I could fully enter into the feelings of one of the illustrious makers of modern chemistry, the immortal Scheele. *"There is no delight like that which springs from a discovery; it is a joy that gladdens the heart"* To plough the new field thus opened up and to explore the untrodden regions was a constant source of thrilling excitement .... the appreciative and congratulatory letters from eminent chemists like Roscoe, Divers, Berthelot, Victor Meyer, Volhard, and others not only filled me with inspiration but stimulated me to further activity.

At this time I was also indulging my favourite hobby, - researches into the history of chemistry, including lives of the makers of our science. Kopp's *Geschichte* was a hard nut to crack; its long-winded and involved sentences were by no means easy reading, but so great was the interest created day by day that I waded through it. I ungrudgingly devoted my precious morning hours to mastering its contents. I also knew full well that our *Kavirajas* (Ayurvedic physicians) used many metallic preparations of which an account is given in Udoychand Dutt's *Materia Medica of the Hindus.* My curiosity prompted me to read some of the original Sanskrit works quoted in this pioneering work.

In the Presidency College library, I came across Berthelot's *L' Alchimistes Grecs,* which further stimulated my inquisitiveness. About this time, I was brought into correspondence with the great French chemist himself. Berthelot sent me three monumental volumes of his encyclopaedic work on Syriac, Arabic, and middle-age alchemy. I greedily devoured the contents of these, and the idea now firmly took hold of me that I must write a history of Hindu chemistry modelled upon the exemplars before me.

I was not at all appalled by the gigantic nature of the task. I instituted a vigorous search for manuscripts bearing upon the subject and ransacked the pages of 'Aufrecht's *Catalogue Catalogorum,* Bhandarkar's, Rajendra Lal Mitra's, H P Sastri's and Burnell's Notices of Sanskrit Manuscripts and put myself in communication with the librarians in India and the India Office, London, where some of the manuscripts have been preserved. Pandit Navakanta Kavibhusan, who acted for four or five years as my amanuensis, was also deputed to Benares in search of old works on alchemy.

Any one who has experience in collecting manuscripts in India knows what ravages the white ant, the silver fish and other insects commit on them. The damp climate of Bengal is specially unfortunate in this respect. It was often necessary to collect as many as 3 or 4 manuscripts of the same *Tantra* since sometimes the introductory pages were found eaten up by worms, sometimes again the concluding portion; there were also discrepancies in the readings of different manuscripts.

The following extract from the preface to the first volume of the history [History of Hindu Chemistry] represents in a nutshell my object in undertaking the task. "Since *the days of Sir W. Jones, Sanskrit literature, in almost every department, has been zealously ransacked by scholars, both European and Indian. As the results of their labours we are now in possession of ample facts and data, which enable us to form some idea of the knowledge of the Hindus of old in the fields of Philosophy and Mathematics including Astronomy, Arithmetic, Algebra, Trigonometry, and Geometry. Even Medicine has received some share of attention ... One branch has, however, up till this time, remained entirely neglected namely, Chemistry. Indeed, it may be assumed that on account of its complex and technical nature it has hitherto repelled investigators".*

It was a source of gratification to me that almost immediately on the appearance of the first volume it was welcomed with high encomiums both at home and abroad. Svante Arrhenius in his *Chemistry in Modern Life* (English translation by Leonard) quotes from the Hindu Chemistry at length and assigns to India the priority in the use of metallic, especially mercurial drugs.

The preparation of the first volume of the History of Hindu Chemistry entitled such hard and continuous labour that it did not leave me much time to pursue my studies in modern chemistry, which had been advancing by leaps and bounds and making gigantic strides. During these years argon had been isolated by Rayleigh and Ramsay and its discovery was soon followed by that of neon, xenon and krypton. Radioactive properties of certain compounds and minerals were being studied and examined by Becquerel, Rutherford and Soddy, and the Curies had brought to a culmination the researches in this line by the discovery of radium itself. Ramsay soon showed that certain emanations of radium itself were converted into the gas helium and this was again an irrefragable proof of the transmutation of elements. In the meantime atmospheric air had been liquefied in quantity by Dewar. No less astounding was the liquefaction of hydrogen.

While these epoch-making discoveries were following one another in rapid succession, I was buried in my researches into the chemical knowledge of the Hindus of old and therefore losing touch with the modern world. On the completion of the first volume I therefore paused in my antiquarian studies and put aside altogether for a few years my completion of the promised second volume *of Hindu Chemistry* as I had now to catch up and be *en courant* with modern chemical literature. It should be noted here that my laboratory work was never allowed to suffer. In fact, an unbroken series of papers on the nitrites appeared during this time in the scientific journals, chiefly in that of the London Chemical Society.

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* Reprinted from Resonance–Jan, 2001.

Co-operation and Economic Welfare*

It is with great pleasure that I take part in the opening of this new bank premises. For though my work is confined to a different sphere I have spent much of my time in trying to find out ways for our economic progress.

We are now passing through very depressing times. The economic condition of the people is really distressing and that of the credit institutions more so. That you have been able to set up this new premises for your bank appears to me as a ray of light in the surrounding gloom. The financial condition of your institution at least must be better than that of many others.

Banks serve as the barometer of the financial condition of a country. They act as an easy indicator for ascertaining how the finances of a country stand. In India they are of far greater utility than in countries where the economic life is stable and well-organised. There, the duty of banks consists merely in helping the proper functioning of economic life. The duty of our credit institutions does not come to an end by merely helping the normal flow of money. Their assistance is necessary to a great extent in our economic reorganisation. Those who devote themselves to this end stand in urgent need of the co-operation and coordination of such institutions.

Rural banks have a special part to perform in this respect. Reconstruction of villages is essential for improving our economic life. It is here that these banks have their field of work and their utility and importance can in no way be minimised.

To achieve the object indicated above, co-operative organisation affords greater facilities than credit institutions founded and run on capitalistic principles. The main objects of the latter is to earn a good profit, consideration of general welfare being of subsidiary importance. Of course, there are foreign examples of such institutions combining to adopt measures for national welfare. But little progress in this direction has been made in this country. Profit is not the main concern of a co-operative institution. It attempts to elevate the economic life of the poor and helpless masses. It aims at dispensing with the middleman, thus enabling the producer to get an adequate value for his produce and the consumer also to get it at a proper price. The profit it makes comes back to the people who constitute its membership. It is thus possible for a co-operative institution to devote itself mainly to rural economic welfare.

In order to improve the condition of villages there ought to be a joint effort to re-organise agriculture and cottage industries. Money must again flow to the villages through the latter. As a result of the present revolution in the social order there is a rush to the town and the arts as well as the artisans of villages are dying out. Our village life is now almost wholly dependent on agriculture, but even there the grinding poverty of the agriculturist makes any improvement very difficult. For this the co-operative method affords the best remedy. This is proved by the examples of other countries. A network of small co-operative institutions should be spread throughout the rural areas in order to re-establish village industries and to improve agriculture.

Such a move will serve us in a number of ways. We now find our industries and trade suffering from want of funds. On the other hand a considerable portion of our savings is lying unused outside the field ofbusiness. The establishment of such rural cooperative institutions as indicated above will help the solution of this problem by drawing out the small savings of poor people to be invested in industry and agriculture. Such institutions will also help agriculturists to get loans at cheap rates of interest and remove many other difficulties from which they suffer.

But to achieve this object co-operative work needs adequate development and expansion. According to Mr. F. D. Ascoli, out of every 150 cultivators only one gets advances from banks and for every rupee of such advance by banks the Mahajan advances Rs. 258. If other credit institutions are excluded from this account, the advances made by co-operative banks fall extremely low. Mr. Ascoli made his calculations at a time when the co-operative movement was in its infancy. Things have, of course, improved since then. According to an official statement the proportion of members of agricultural credit societies to families in rural areas in this province was 4.7 per cent in 1928-29. At present it may be estimated at, say, 5 per cent.

In this connetion it is gratifying to note that the work of the Co-operative Department in Bengal is gradually extending. The report on the working of the co-operative societies in this province for the year 1930-31 shows that during this period the number of co-operative central banks rose to 119 and that of affiliated societies from 19,071 to 20,278. Their total working capital rose from Rs. 455.71 lakhs to Rs. 488.69 lakhs. The total paid up capital rose from Rs. 51.52 lakhs to Rs. 53.32 lakhs. Taking into account the severe economic distress through which the country has been passing since 1929 the progress achieved is certainly hopeful.

The unprecedented fall in the price of agricultural crops is one of the principal causes of our present difficulties. Of this the slump in the jute market deserves special mention. It has unsettled the working of many of our credit institutions and rendered the existence of a large number precarious. For the present we have no means of tackling this difficult problem. But mere ought to be some attempt to make such crises impossible in the future. Whatever be the crop that is produced to meet the requirements of foreign trade, the producers will inevitably suffer whenever there is a slump. The only way open to our cultivators is to combine for controlling the production of jute or, when necessary, to produce other crops in its place for home consumption. Silk, cotton and sugarcane may be suggested as alternative to jute. Much could also be done to improve the production of'Gur'. The instance of Russia shows what the agriculturists can do by combination and co-operation.

Want of education is one of the chief obstacles that beset the co-operative movement in this country. The masses with whom the societies have to deal are mostly illiterate and lack all knowledge of the principles of co-operation. Members of the rural societies themselves do not often possess such knowledge. There is also a paucity of trained officers who can be entrusted with the work of educating the masses in the principle of cooperation. Both the Government and the public are responsible for this want of education. The societies have not played their part for removing it. They could have done much in this direction as is proved by the example of European countries where the movement has spread widely. The societies in the western countries set apart a portion of their profit for educative purposes. That principle ought to be adopted here as well. Both the Central and theBengal Provincial Banking Enquiry Committee have urged the spread of education and special training of officers and the former committee has formulated a detailed scheme for this purpose. For the growth of the movement, spread of primary education is also essential.

In this connection let me make certain general suggestions for conducting your work on sound banking principles. Dues from societies or individuals should be realised with utmost regularity. If they once begin to fall in arrears they become ultimately unrealisable. The terms of a loan should be determined according to the importance of its object and small-term deposits should never be employed in long-term investments. The tentral banks have been advised by the Indian Banking Enquiry Committee to confine themselves to short-term and intermediate credit, leaving long-term credit for land mortgage banks. Loans given to cultivators should be sufficient for their requirements and should never be allowed to be diverted from the object for which they are ostensibly taken.

Generally speaking, a central co-operative bank should not have under it more societies than it can finance. The Indian Banking Enquiry Committee recommends that central banks should operate over fairly large areas and have a goodly number of societies affiliated to them. The recommendation of the Bengal Banking Enquiry Committee is more specific. It prohibits the splitting up of central banks before the number of affiliated societies reaches 300; even then, no new central bank should be formed until a sufficient number of men of intelligence, influence and possessing knowledge of co-operation can be found in the locality to form the directorate. Fluid resources of the banks should never be allowed to fall below a fixed level. Overdue unrealised interest should not be considered as assets in declaring dividends.

Certain important recommendations of the Central and the Bengal Provincial Banking Enquiry Committee about the working of the co-operative banks should be mentioned here. They have been advised to set up a bad debt fund and contribute to it regularly as is done in the case of reserve funds. The Bengal Committee has referred at some length to the important nature of their work and has recommended that they should be entrusted with more responsible work like land mortgage. But the financing of primary societies being their main object, the central banks have been advised not to undertake commercial banking. Inter-lending amongst different co-operative banks and between these and other credit institutions has also been disapproved.

The guarantee ofRs. 30 lakhs offered by the Government of Bengal on behalf of the Provincial Co-operative Bank is significant and is a sufficient assurance to the depositors that their interests are safe. The Provincial Bank as well as the Bengal Co-operative Organisation Society are important agencies in the development and regulation of the co-operative movement. The necessity of such central organisations for the growth and expansion of the movement has been folly demonstrated in western countries. These institutions deserve your fullest co-operation and support.

The movement is likely to expand as time goes on. The Royal Commission on Labour has recommended the adoption of co-operative methods for the uplift of workers. Relieving indebtedness, providing pure food and cheap habitation in industrial centres are some of the features of the plan suggested for the present. The movement is bound to expand on the non-credit side. Such expansion of the movement is likely to relieve unemployment to some extent.

For this the Government ought to help the movement more liberally with money. The public ought to give up their attitude of apathy towards it for its official association as most of its work is carried on by non-official agencies. The Universities and many of our educational institutions, the hospitals, the Calcutta Corporation, and local self-government bodies are also similarly situated. But there is no lack of popular enthusiasm to participate in their work, as a great amount of public good can be done thereby. For the very same reasons people should join the cooperative movement more largely. The larger the number of independent persons coming into it the greater will be its progress.

> "When *I have* served *my time, I shall still want to live again and again in the lives of those who will cany on the struggle from generation to generation untill the four-fold curse of tyranny, injustice, poverty and ignorance is lifted from the brow of my beloved long-suffering Motherland"*
>
> —*P. C. Ray*

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* Address delivered by Sir P. C. Roy at the opening of the new building of the Beliaberah Co-operative Central Bank, Beliaberah, District Midnapur, Bengal.

Curtsey : Pinak Pani Datta.

Bengalis in Commerce and Industry

At the outset I must thank Dr. Syamparasad Mookherjee, Chairman of the Appointments Board, for asking me to say a few words about the position which Bengalis occupy in the sphere of trade, industry and commerce of the province. It is indeed gratifying to find that the University of Calcutta has at last recognised the supreme need of diverting the attention of its products towards industrial and commercial careers. And to one who has during the last half a century tried, in season and out of season to impress this idea on the people of Bengal this move is a welcome one. I know that the task is an immensely difficult one but when the cause is good success is sure to come, sooner or later.

In order to appreciate the position which the people of the province at present occupy in its commercial and industrial activities I would like to give at first an idea of the position which the Bengalis occupied at the time of early settlement of the East India Company in Bengal. It may not be known to many of you that when Calcutta with two of its adjoining villages was selected as a place of settlement by the English merchants they took up the task of developing it with the help of the people of the province. The Seths and Bysak who were the earliest settlers played their part well and contributed their quota in solidly laying the foundation of the commercial capital of India. It is true that to-day when one speaks of Burrabazar one means the Marwari quarters But even seventy years back Burrabazar was a Bengali centre from whence radiated the threads of commerce and industry. Bengali merchants were all-powerful in all important trades such as rice, jute, textile, sugar, timber, salt, etc. In Radhabazar street originally all the woolen merchants were Bengalis.

I have referred in my *Autobiography* to an interesting booklet entitled *A short account of the Residents of Calcutta in1882* by Babu Ananda Krishna Basu. This book contains a list of wealthy men of the town, including residents who became with by trade and business. I select a few names only (old spelling retained) :—

1. Bysnubdoss Sett—He was an old inhabitant of Calcutta and a virtuous and respectable man and very rich; he as well as his forefathers were Dewans for the purchase of piece-goods for theHonourable Company; all the Setts and Busakhs of Calcutta are his kins and relations.

2. Ameerchund Babu—He was first Jumadar of the Export Ware House and then having acquired money by trade became Contractor of the Honourable Company's merchandise and purchase of all the goods imported by individuals and thereby earned upwards of a crore of rupees. He was a charitable man and lived at Burrabazar and supported all the Sikhs of his class here.

3. Luksmikant Dhur—He was a very opulent man and Banian to several fromer Governors and Colonel Clive; he died without issue and was succeded in his immense fortune by his daughter's son Moha Raja Sookhamoy Roy (who obtained the title of Raja at the time of Marquis of Wellesley and was a Director of the Bank of Bengal).

4. SobharamBusakh—He was an opulent native of Burrabazar and seller of piece-goods to the Honourable Company and traded in various articles.

5. Ramdulal De Sircar—He was first in the service of Mudunmohun Dutta and acquired almost incredible opulency by serving Messrs. Fairlie & Co., and American Captains as well as by trade on his own account and lived at Simleah in Sootanooty. He began his career as a clerk on Rs. 4 or 5 a month and rose to the positon of one of the foremost merchants in Calcutta. He died in 1824, leaving a large fortune of about £ 400,000

6. Gobindchund Dhur—He was son of Nilmoney Dhur, Banker, and acquired wealth by serving European Ship Captains.

The most notable feature is that in the above list there occurs the name of only one non-Bengali.

A few decades ago almost all the banians (mutsuddis) of the European Houses were Bengalis. Below is given a list of some of the notable ones:—

Gora Chand Dutta (Crooke Rome & Co.); after his death his son

Chandi Dutta entered into partnership with one Chandra Dhar of Chinsurah and carried oon the business. Later on one of their sub-agents, Ghursamal Ghanasyamdas, became the banian of the firm—the Bengali losing his ground.

The firm of Prankissen Law & Co. were banians of eight European Houses among others, Graham & Co., Pickford Gordon & Co., Henderson & Co.; Abhoy Charan Guha son of Shib Ch. Guha was banian of nine European Houses, e.g., Grahma & Co., Pill Jacob, Swiney Kilburn & Co., Sacherstein & Co.; Lalit Mohan Das (died about 1890) was banian of Geo. Henderson & Co., Chartered Mercantile Bank, Ltd., Rose & Co., and Ralli Bros.; Dwarka Nath Dutt (as well as his son Dhirendra Nath Dutt) was banian of Rallil Bros. (piece-goods deparment).

It is of interest to note that "the first Jute Spining machinery on the Hugly was introduced by George Auckland; he arrived inCalcutta in 1825-53 where he made the acquaintance of Babo Bysumder Sen, a native banian (financial agent.)*** Here (at Rishra), then, about the middle of 1855, the first India machine jute spinning mill was cradled.*** For three years Auckland carried on the business in company with his native partner." Similarly the first important bank in Calcutta on modern lines, I mean the Nationsl Bank of India, was established with the capital and co-operation capital of which at present is £ 2 millions with a reserve fund which is more than the paid-up capital, was established in 1863, under the name of Calcutta Banking Corporation, which was changed to the present name of March 2, 1964, "The Head Office was at first in Calcutta, but was transferred to London in 1866. As a result of this, the bank lost its predominantly India character. It may be recalled in this connection that at the time of transfer, four out of seven directors were Indian, viz., Babu Durga Churn Law, Babu Heeralal Seal, Babu Patil Paban Sein auditors one was a Bengali, Shyama Charan De, Esq."

But when the present system of education was introduced the middle class Bengali was the first to take advantage of it. He at once found that the new knowledge not only benefited him intellectually but opened up new sources of earning with least amout of trouble and without any risk. In those early days it was easy for him to secure a decent clerical post even with very scanty educational qualifications. Some of his more progressive brethren were fortunate in securing posts in the higher public services; while the boldest of them went a step further and adopted some independent learned professions and were successful, there being few competitors. The result of the new system of education was that even yougnmen of business families preferred to abandon family business in favour of service And while the Bengali showed his apathy and aversion towards a business career this field was being captured by the sturdy sons of other provinces with the consequence that although we call this city of Calcutta as the city of palaces but the palaces are occupied by the Marwaris and the gates are guarded by Rajputs. Similarly a student of economics not conversant with the deeper undercurrent of the economic life of Bengal would exultingly cite the export and import trade returns as supplied by custom house and congratulate the province on its prosperous condition, forgetting all the while that there is a skeleton concealed in the cupboard.

The position which Bengalis occupy to-day in the business of the province can be realised by any of you if you move around the city of Calcutta and its suburbs with your eyes open. On both sides of the Hugli there are numerous jute mills but except one or two none is under the control and management of the Bengalis. One can realise the magnitude of this important industry when one is told "that more than Rs. 18 crores is invested in the industry" and "the market value of the jute mill shares is nearly Rs. 35 crores or nealry twice the amount of all the capital paid-up." In coal mining industry, another important industry of the province, the Bengalis cut a sorry figure. In this field the Europeans are first and foremost; among the Indians Gujratis and Marwaris are in the forefront. But like the jute mills industry in the coal mining industry too mining operations on a large scale were carried on by the Europeans in co-operation and with the aid of Bengalis. It is interesting to note in this connection that Bengal

Coal Co., Ltd., which is one of the important coal concerns, was formed in the year 1843 by Messrs. Gilbert Homfray & Co., and Messrs. Carr Tagore & Co., and this company is the oldest Joint Stock Company is Bengal.

By virtue of protection the sugar industry of India has in recent years made astounding progress. In 1931 when the Tariff Board recommended protection to the sugar industry India had only 32 sugar mills. In 1937-38 the number of mills was 154 and India has practically become self-sufficient in the matter of sugar. Bengal happens to be one of the principal markets of Indian sugar. But it is extremely unfortunate that although Bengal happens to possesss a few sugar mills, which are absolutely inadequate to meet the local demands, practically none of these sugar mills own their existence to Bengali capital or enterprise.

The cotton mills industry of India got a big impetus when the torch of swadeshism was kindled by Bengal. How the Bengalis have been exploited by the Bomaby mill-owners and their patriotism traded upon was admitted by a mill-owner to Mahatma Gandhi when he said that "in the days of Partition we, the mill-owners, fully exploited the Swadeshi movement. When it was at its height, we raised the price of cloth and did even worse things." But what did the Bengalis do? Inspite of having all the natural advantages for establishment of cotton mills industry, the assured "home market" and above all the spirit of swadeshi to act as "tariff wall", we could not till recently make any serious attmept to establish cotton mills. It is true that now Bengal possesses a few cotton mills but they are quite inadequate to meet the enormous demand. The same tale can be told about the salt industry, another protected industry.

Bengal is an agricultural country. The produce of the land—rice jute, oilseeds, pulses—is mainly controlled by the Marwaris, who would also have taken a large share in the export of hides, had it not been for the fact that their religious prejudices stand in the way. The import trade of Bengal is also, to large extent, in the hand of Marwaris; not only are they banians of the importing European houses, but between these and actual consumers there is an interminable series of dealers and middlemen most of whom are not people of the province. Then again I find that although Calcutta happens to be the Headquarters of 3 principal railways of India even the construction and repair works of these railways within the province of Bengal are the monopoly of Cutchis, Gujratis and Punjabis. Even in regard to the construction of the new Howrah Bridge like the Williongdon Bridge, the Bengalis are nowhere. But look at the Marwaris. He is here, there, and everywhere. He finds out by a sort of instinct where money is to be made; wherever he goes he manages to get a foothold, established himself permanently and the local hereditary traders and merchants belonging to Saha and Tili castes gradually disappear.

The two essential elements to ensure success in trade and commerce are sadly lacking in the Bengali character—I mean a spirit of enterprise and a business instinct. On the other hand the Bengali unfortunately has given too wide a scope to idealism at the expense of practicality. The very emotional side of the Bengali stands in the way of his takin g up sustained work—requiring life-long devotion to a cause. "The characteristic of heroism," as Emerson has it, "is its persistency. All men have wandering impulses, fits and starts of generosity. But when you have chosen your part, abide by it, and do not try to reconcile yourself with the world." The Bengali is lacking in patience; he is always after quick results—he is for reaping without sowing. Sensationalism appeals to him more than steady, silent work away from public gaze. He is for the attainment of his end by "direct action" and quick methods, hence sustained work requiring life-long devotion and unflagging zeal does not appeal to him. In this connection I would like to quote the observations of an eminent ex-pupil of mine, who has thought much about the failure of the Benalis in business. He says : "I have examined and cross-examined dozens of Marwari businessmen, I have intimate knowledge of their capacities and limitations, as their legal adviser. My very definite opinion is that the Begali, even in his present decadent condtion, is far more intellgent than these people I have often tried to analyse and find out the secret of Marwari success, and their grip over Bengal. They have no education, no technical knowledge and suffer from most tyrannical and narrow-minded social customs and laws. Why do they then succeed? My own belief is that, as between themselves, they show an amount of trust and co-operation, which in incredible to the outsider, and which I do not find in Bengalis."

In conclusion let me repeat that the utter helplessness and ineptitude of the Bengali in business are due to his highly emotional and impulsive nature. The rapid means of communication has brought him in touch not only with the European but also with the Japanese and Chainaman, as also with the non-Bengali—the Marawri, the Gujrati, the Borah or Nakhoda, the Parsi, the Behari or the U. P. man, the Punjabi., the Oriay, the Cutchi and the Sindhi. The ground is being cut from under his feet in every walk of life and activity. His cook, his domesitc servant, his ferryman, his coolie, often his labourer in the field, his cobbler, his dhobi, his barber—all these are recruited from outside his province. The internal trade of his land has passed away from his hand as well as his export and import trade. In a word, as far as bread-earning problem is concerned, the Bengali is hopelessly floundering in the land of his birth. It is this heart-rending state of things which has been almost a source of agony to me during the last quarter of a century and more. In fact, the failure of the Bengali in the economic world has been my obsession, so to speak. I, therefore, very much welcome the move initiated by Dr. Mookherjee for narrating before you the scope which different industries of the province offer to you by eminent businessmen of the city. I know that for the present deplorable condtion of our youngmen with fine intelligence they themselves are not to be blamed. But on them rests the task of proving to the world that as in patriotism similarly in business they do not lag behind other provinces.

I have ventured to say many things about the shortcomings of the Bengali with the fond hope that my timely note of warning will not be a cry in the wilderness. The Bengali has got many noble qualities and I am proud of my nationality and I glory in being a Bengali. In one essential aspect, however, he has proved to be a dismal failure, namely, in the art of earning lilvelihood. I have not, therefore, spared any pains to dissect the Bengali character and lay bare its weak points. Like a surgeon I have plunged the lancet deep into the flesh so as to remove the morbid tissue and apply healing balm The Bengali people is after all my own people and its faults are my own faults; and its many redeeming qualities are euqlly my own. I have thus a moral right to give such advice to it as I think fit to give.

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Rupee Ratio Question

In a statement to the Press Sir P.C.Ray says:-"

"On my return from Madras I got a telegram from Dr.Rabindranath Tagore requesting me to discuss the rupee-ratio question with the President and Secretary, Currency League of Bombay. But as I was late by a day I had not the pleasure of discussing the question with them "As I am to some extent responsible for the opposition of Bengal against lowering the rupee-ratio I would like to clarify my position to the public. It has been observed that the statement which I issued to the press on the 4th November last 'was not based on a wide and comprehensive survey of the totality of the economic interests of the country as a whole.' As Bengal happened to be the worst sufferer as a result of the economic depression, I was naturally prompted to keep in my mind the interest of Bengal but I think I would not be far wrong if I say that what I stated in my statement would be equally applicable to all the provinces in India.

"I admit that to alleviate the sufferings of the agriculturists we should concentrate our whole energy on raising the prices of India's primary products and I fully appreciate the anxiety of the Currency League on that point. But it is my firm belief that we cannot achieve our objective simply by means of devaluating our currency . It is true that in 'normal' years currency depreciation would have acted as a lever for encouraging our exports with a consequent rise in prices . But we must remember that particularly since the year 1931 various agricultural countries like Argentine , Canada , New Zealand, Australia, etc, have bad recourse to this method but none of them has profited by it. We must not also forget that world trade is still at its low ebb. In that view of the matter , currency depreciation alone , which is not the monopoly of any one country , cannot bring about a revival of the world trade.

"In yesterday's "Statesman" I find that the Bank of England's statistical summery for November containing indexes of primary commodity prices in the United Kingdom and the states since

September 19, 1931, shows that 'neither Great Britain nor the United States has been able to raise the price level by monetary action.' As regards the price movement during the trade year 1932-33 I read in the 'Review of Trade of India' that 'countries with depreciated currencies - with the sole exception of Japan - and those that retained Gold Standard both suffered from declining prices.'

"It has been argued that when during the last three years there has been greater proportionate decline in our trade balance in comparison with other agricultural countries there must be something radically wrong in our present ratio. I do not claim that our present ratio is an all perfect one. But what I should like to say is that we must not solely blame our ratio for the present depressing state of affairs in our country. For instance , in the year 1930-31 India imported only Rs.14 lakhs worth of sugar machinery whereas in 1932-33 she imported Rs.1,53 lakhs of sugar machinery. Similarly in regard to cotton machinery the value of her imports in 1930-31 was Rs. 1,78 lakhs and in 1932-33 Rs, 2,08 lakhs. This is only one instance to show why there has been greater proportionate decline in our trade balance during the last 2 or 3 years.

It is for this reason that the Rt Hon'ble R.B.Bennet, Prime Minister of Canada, stated before the Committee on Monetary and Financial Question at Ottawa : "We recognize, of course that the monetary objectives which have been named can only be fully attained by broad international action. We recognize also that monetary action is only one line of approach to the solution of world's problem and that must be accompanied by other remedies, perhaps of a more fundamental character'. "The Macmillan Committee which was composed of eminent economists, financiers , and businessmen and which included no less an authority than Mr. J.M Keyenes, after carefully examining the devaluation course said; "We have no hesitation in rejecting this course'. It is true that after the publication of the Macmillan Committee Report Great Britain abandoned the Gold Standard but has she been able to raise the prices of primary products? "It has been suggested that when the rupee is overvalued why should it not be brought down to the equilibrium rate. If in order to establish the case that the rupee is over-valued we take the help of past 2 or 3 years' trade figures , ignoring other important factors , a case may be made out. But when we find that during the last seven months from the 1st April to 30th October, a period of inactively, India has been able to secure a favourable balance of trade to the extent of Rs. 19.67 crores and which is more than five times that of the year 1932-33 it is really difficult to say that the rupee has not reached the equilibrium rate. As for the argument that is phenomenal improvement of India's trade position is due to the improvement of the world's economic condition and not due to the fact that the rupee has been adjusted I am afraid there is some confusion of thought. When there is some healthy expansion in the consumers' demand commodity prices rise and the value of currency automatically declines in terms of goods. I am, therefore, of opinion that the rupee does not at present appears to be over-valued in terms of sterling.

"No one will deny that the immediate effect of devaluation of the rupee would increase the Home Charges with the consequent increase in taxation. The economic world is passing through a process of adjustment. There can be no absolute guarantee that 'moderate currency depreciation would mean a rise in prices. It would, therefore, be absolutely unwise to increase the taxes over and above the 25 per cent Surcharge.

"It may be argued , and rightly, that one of the immediate effects of devaluation would mean indirect protection to the industries. But when India has never grudged to grant protection to her 'infant' industries would it not be better to obtain protection openly by establishing the case of it?

"The advocate of devaluation and particularly those who want delinking have altogether ignored the effect of this monetary action on our exchange. I am sure they would agree that in case the rupee be delinked and allowed to find its own level there will be an inordinate fluctuation in our exchange rate. Mr. Bennet , the Prime Minister of Canada, said last year at Ottawa-'the evils of fluctuating exchanges are specially injurious to Canada because of the importance of foreign trade in our national life'. I think his views are applicable to India as well. "I had started that this devaluation move would restrict the establishment of cotton mills in Bengal. By way of a reply it has been said that as Bombay imports greater quantity of machinery than Bengal she would be equally affected. It is true. But we must not lose sight of the fact that the total values of Bombay's imported machinery greater portion goes for replacement; whereas in the case of Bengal most of her imported machinery, in the lines of textiles, is required for starting new mills. In the opinion of a Calcutta daily, which is fully 'convinced' that the rupee is over-valued, 'the value of our total production is much higher than the capital value of machinery replacement purchased yearly , it is obvious that the protection to the articles produced is of much greater benefit than the relative unimportant advantage of cheaper machinery'. One can , therefore , realize that to Bombay cheaper machinery is of 'relative unimportant advantage' whereas to Bengal, where it is very difficult to pool resources even for starting a small cotton mill, cheaper machinery is not an 'unimportant advantage'. "I may state in conclusion that in 1927 I was one of the staunchest supporters of 16d.rupee. The public may ask me why then am I now supporting 18d.rupee?. My answer is that when I wanted 16d.rupee I wanted 16dGold rupee and the present. sterling rupee which is an altogether different thing to-day. However as I observed in the "Hindu" of Madras on the 28th November last I once again say that 'I do not claim that our rupee is 'knave proof' or 'fool proof.' What I say is that the time is not opportune for altering the ratio. When the condition of the world would be somewhat normal it would be better to review the whole situation in the light of new circumstances and to fix the ratio at such a suitable figure as will be conducive to the interests both of the agriculturists and the industrialists. For the present, we should concentrate our whole energy on the industrial development of the country which alone can set right the present economic mal-adjustment from which all of us are suffering."—(A.P.)

"Further, there are two more important factors to be considered. Firstly due to world factors, prices of raw materials, which India mainly exports, fell disproportionately as compared with manufactured goods which she imports. And secondly, the gold exports maintained, to some extent, the purchasing power of the country without which the imports would have been much less.

"It has been claimed that in regards to jute and tea 'the actual trade figures do reveal some improvement during the year 1932-33 as compared with 1931-32 obviously influenced by depreciation of rupee following England's abandonment of gold.' I admit that from the quantum point of view there had been some expansion but had that been able to influence the prices? In 1931-32 by exporting 663 million cwt. of jute manufactures India obtained 21.92 crores and in 1932-33 by exporting 679 million cwt. she obtained Rs.21.70 crores or 22 lakhs less. As regards tea, in 1931-32 by exporting 341 million Ibs of tea India obtained Rs. 19.43 crores whereas in 1932-33 by exporting 378 million Ibs. she obtained only Rs. 17.15 crores for which it has been written in the 1932-33 Trade Review that ' the tea industry in the year under review passed through one of the worst years'. If this be the lesson of the past years when the rupee remained depreciated to the extent of 36.2 per cent, how can we say that the remedy lies in the monetary action alone and that in an isolated manner?

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* Sir P.C. Roy's Statement Amrita Bazar Patrika, 8.12.1933 From National Library Archives, Kolkata.

The Sixteenth Bombay Provincial Co-operative Conference

I thank you most sincerely for the honour that you have done me by asking me to preside over the deliberations of this Conference. I very much regret that it was not possible for me to respond to a similar invitation that you had extended to me a few years ago. I feel, however, that my unfamiliarity with the technical details of the subject matter of your discussion and with the conditions of your province disqualifies me for the position that you have been indulgent enough to thrust on me. When, therefore, you communicated to me a list of the subjects you have selected for discussion during the present session. I felt and hesitated whether it would at all be right and proper for me to allow you to instal me as your "guide, philosopher and friend" even for the brief period of this Conference. I come here not as a teacher, but as a learner.

Though I am not an expert in matters with which you are concerned and am not in possession of the necessary credentials entitiling me to offer leading and guidance to you, I am not wholly an outsider amongst the assembled veterans of the co-operative movement. I happen to be connected with the movement from almost its inception in my province, and as some of you must be aware, besides being a life-member of the Bengal Co-operative Organisation Society, I have long been associated with one of the earliest among the Central Co-operative Banks in Bengal that was organised in my native village. My elder brother, who unhappily is no more, was the guiding spirit of this bank, and it was only the other day that I was asked formaly to open its new building, it having all this time been housed in our family residence.

My association with the co-operative movement, however unobstrusive and casual it might be, has convinced me that in our present peculiar circumstances, co-operative societies furnish one of the most effective means for the improvement of the economic condition of the vast mass of Indian people. Although scientific study and research have so far claimed my foremost care, I have not been wholly unconcerned with the problem of economic uplift of the Indian people. It is, perhaps, this more than any thing else that has led you to requisition my services for the present function. I am afraid, it will not be possible for me to advise you or enlighten you in your discussion of matters relating to administrative and technical details. What I propose to do, therefore, is to offer some observations as to how the co-operative movement may be utilised in an effective manner for the social and economic well-being of our people and transformed into a genuine national movement.

Those who are familiar with the history of the modern development of the co-operative movement in countries in which it has taken root, will at once testify to its remarkable achievements in social and economic spheres during the last decade or so. In their work on "Economic Development of Modern Europe", Ogg and Sharp give an excellent account of the progress made by the movement during recent years. "There is, indeed, no country of Europe," they say "in which the co-operative movement has not attained considerable proportions. The results are by no means confined to the diminution of expenditures, the increase of savings, and the amelioration of conditions of livelihood. The sense of social solidarity is perceptibly strengthened and labour is brought to a realisation of the highly important fact that the promotion of its essential interest may be attained by pacific and scientific means no less than by aggression and combat". While referring to the progress of the consumers' co-operatige movement, the writers add : "At various junctures we have come into contact with the term 'co-operation' in connection with the economics of war and reconstruction. Nowhere, however, has the word meant more during the last ten years than in relation to the consumers' co-operative movement, endeavours to prevent the exploitation of the whole population considered as the consumer of goods, not by any revolutionary process, but by the building up by slow and peaceful methods of new socially owned capital."

I specially emphasised this aspect of the co-operative movement in my address at the celebration of the International Co-operators' Day in Calcutta last year. I would like to repeat what I said at the time : "The industrial upheaval of the west has, after a century, just reached the soild of India, bringing in its train, many of its evils, and I ask you to believe me when I say that one bed-rock of hope in this age of convulsion is co-operation. You must also beer in mind that, inspite of the universal clash and clang in almost every country, the co-operative movement is gaining ground day, month, year after year. No narrow national and racial interests have been able to chain it down, its progressive carreer is still accelerating. The colossal International Co-operative Alliance supported by the big co-operative institutions of various lands, has linked up different nation in one vast co-operative community, and we in India pride ourselves on being members of this world-wide brother-hood. * * * I invite you all to join this mighty movement, whose aim is to lift man's material life to a higher plane, to give to it a nobler; a more spiritual tone, and to bind together the races, creeds and classes of the earth in sacred and everlasting union."

It is often said with reference to the co-operative movement in this country that it has not so far been able to imbue members of co-operative societies and other associated with these bodies with spirit underlying it. That there is considerable force in the charge so frequently brought forward against the movement in India by critics that it is chiefly considered as an agency for the supply of facilities for credit and looked upon by many principally from the point of view of material gain, no body acquinted with its working will deny. But this is a complaint which is not peculiar to India alone. If you will take to trouble of going through the first article in the October number of the *Review of International Co-operation,* the official organ of the Internationsl Co-operative Alliance, you will find that a similar complaint is also made by the writer in respect of members and workers connected with the movement in advanced Western countries. And the writer of the article in no less person than an ex-president of the Alliance.

"The co-operative movement has been "Mr. Goedhart writes, "generally regarded as a means of obtaining the necessaries of life cheaper than elsewhere, or as a source of a useful dividend at the end of the year which would aford to the proper classes the opportunity of purchasing commondities of which they would otherwise have been deprived, and which the strictest thrift in the ordinary channels of expenditure could not have provided." "It is a very singular circumstance", he remarks, "that such an entirely erroneous conception of Co-operative principle should have held its own for so long a time".

If after working co-operative societies for over three quarters of a century promoters of the movement in educationally advanced and economically progressive countries in Europe and elsewhere find the higher aspects of the co-operative movement lacking in it, is no wonder that in India where education is diffused among so small a percentage of her population, and the movement has life and history of not more than twently-five years behind it, the conditions, should be such as unfortunately they are.

It is much to be deplored that the members of co-operative societies and promoters of the movement are not actuated, to the extent that they should be, by the high and noble ideals that inspired its originators, the conditions ini other advanced countries are also similar, but an earnest and organised endeavour to imrpove the conditions.

As yon are all aware, the initial stages of the co-operative movement in India were devoted to the development of only its credit side. Although experiments in other directions have subsequently been attempted and efforts are being made for developing other types of co-operative societies, the progress achieved in these directions has, it must be admitted, been so far most inadequate. Even in the- sphere of credit, considering the vast extent of this country and the almost abysmal poverty of the general body of our people, it cannot be said that the movement has been able to touch more than merely the outer fringe of the area to be tackled. This shows that much, very much, still remains to be done even for the development of "the credit side of the co-operative movement. Whatever might be the imperfections of the co-operative movement as it has been shaped and organised by its prpmoters in India, it is undeniable that it has rendered signal service to a considerable section of the poorest people of this country by reducing the rates of interest and making credits available to them. Bat this does not go far enough so long as the people availing themselves of financial accommodation from co-operative societies are not able to acquire habits of thrift and to diminish their indebtedness by adding to their resources by productive . means.

The indebtedness of the Indian peasantry has been variously estimated. According to the estimates made by Sir Hubert Calvert and Sir Purusottamda Thakurdas, the amount reaches such a high figure as 600 crores. It will not take you long to calculate roughly the figure that represents the heavy sum that has to be paid as interest on this huge amount, and the effect that this exercises on the future prosperity of the cultivator. It can well be imagined how this reduces the Indian cultivator to the position of one who is no better than a serf. The ryot is thus in blank despair. He knows however hard he may toil the fruits of his labour will be snatched away, first by the exacting revenue officer and then by the mahajan and the ubiquitous middleman. To him is presented the picture of Dante's Inferno, on the gates of which are written in bold letters, "All ye who enter here abandon hope."

You will thus see that matters have not much improved since the Indian Famine Commission reported after the disastrous famine of 1877-78 half a century ago, 'how far it is possible for Government by its action, to diminish the severity of famines, or to place the people in a better condition for enduring them," however persistent and energetic might be the efforts that are made from time to time by spokesmen of Government in this country to prove that better conditions have intervened as a result of the economic policy that is being pursued by the British Government. As an English writer on economic subjects points out in a recent publication, in spite of all that the British have done the vast majority of Indian population "live on the verge of starvation, at the lowest possible level of poverty, threatened by famine and pestilence".

There is no single solution to this deplorable condition. To me it appears that the promoters of the co-operative movement in this country should now devote their attention to a proper development of co-operative activities in directions other than the provision of credit which has so far, practically speaking, monopolised their attention. Methods should now be devised which would enable the people to add to their resources by creating now wealth as also to retain a substantial portion of the profits, misappropriated by the interminable series of middlemen who are to be found in every important or unimportant trade or industry.

Whether the agricultural produce is cotton or jute or paddy or wheat, the cultivators should be encouraged to adopt co-operative methods for its sale and supply. I desire to quote what Mr. Keatinge, with his intimate knowledge of the agricultural and economic conditions of this Presidency, says on the possibilities of co-operative marketing in his excellent monogtraph on "Rural Economy in the Bombay Deccan". He writes: "The possibilities of co-operative credit have already been considered. Those of co-operative marketing are not less great; but the subject is more difficult and needs more careful adjustment to the circumstances of each particular case. To work out an effective system of co-operative marketing suitable to any locality, to organise and sustain such a movement is a task which will require much patience and management. It may be hoped that when the co-operative credit movement is more firmly established some of the enthusiasts now working for that cause will look for new worlds to conquer and will turn their attention to the organisation of co-operative marketing, which offers so vast a field and promises so great a reward". "A common sight on a market day is a continuous stream of people pouring into the town often from distances of 15 or 20 miles each carrying a bundle of produce for sale, wood. grass, *bhusa,* or what not. The effort to the man is considerable, the value of the produce which he sells is often only a few annas:. In the evening he will return home with a bottle of oil, a little salt and spices, or some such trifling purchases, and his day's labour is gone. With organisation the whole of the marketing which used up the labour of five or ten thousand people might have been done by one thousand and the remainder might have put a day's work on their land. To effect this we can only look to an increase of the co-operative spirit which in other countries has done so much to make marketing efficient."

Since Mr. Keatinge wrote in 1912, co-operative marketing has achieved impressive and striking results in American and European countries. In India we arc just on the threshold of this movement. The situation here, therefore', demands more enthusiasm, mare vigorous and better organisation.

There should, I think, be organised effort not only for the development of sale and supply societies of the type mentioned by me for the marketing of our principal crops but when adequate experience has been gained in their working and these have become pretty widespread, attention should be directed to bring within the "co-operative" net, the numerous lesser crops. As has been already indicated, action in this direction had been taken in hand by the co-operative movement in some of the provinces —the Punjab has its dealings in wheat. Bombay, cotton, and Bengal, jute. About the work done in connection with the cooperative sale of agricultural produce in Bombay and the Punjab, the Royal Commission on Agriculture has made special mention. I have no personal knowledge of the working of these societies. But the reports that I have read of the results of this movement in Bombay and the Punjab and the accounts that I have received of the working of the new-born movement of my province for the marketing of jute and paddy from authorities whose testimony I cannot question, give me hope that if properly guided and developed this movement more than anything else can save the cultivator from his present pitiable position. These societies will not only help the cultivator in retaining a substantial portion of his profits that now goes to the middleman but by stimulating production will also indirectly help in creating new wealth.

There is another important sphere where our progress has been most inadequate, I mean, industrial co-operation. In their report the Indian Industrial Commission, 1910-18 strongly emphasised the intimate connection between co-operation and the improvement of agriculture and cottage industries. The Royal Commission on Agriculture do not, however, seam to be optimistic in the matter. They think that to put it briefly, the possibilities of improving the condition of the rural population by the establishment of rural industries are extremely limited, with such a restricted outlook the recommendations of the Commission in the matter cannot be expected to be of much practical help or use. Although the introduction of machine industry in Western countries has had the effect of practically destroying our cottage industries, my enquiries lead me to believe that with the adoption of vigorous measures it is still possible to resuscitate some of these industries and introduce new ones if co-operative methods are adopted. Without some such method I do not know how relief is to be afforded to the vast mass of our rural population, who are obliged to remain idle for 6 to 9 months in the year and need spare-time occupation.

Industrial Corporation by which I mean such cottage industries as have already been developed for the manufacture of cotton, silk, wollen and jute goods ; Co-operative organisation of village artizans who formerly played a very important role in rural economy, but whose industries have been submerged under the tide of organised capitalistic exploitation;: and such other productive rural industries, too numerous to mention; these, if developed, will help the production of new wealth. In this connection mention may be made of co-operative irrigation societies which in the words of the Royal Commission on Indian Agriculture are reported to have changed the whole outlook of the people and to have strengthened their economic position. Public Health societies like our antimalarial societies would, by rousing the sanitary conscience of the people, by inculcating the principle of self-help and by improving the health "of the people and the sanitary condition of villages, check the enormous economic wastage due to disease, that is taking place at the present moment, and thus indirectly help the production of wealth.

There are various other directions in which the co-operative movement may be utilised to help the vast mass of our unemployed and partially employed. It is true that the Consumers' Co-operative Movement has achieved very little success in India. But it is also a fact that wherever it has been brought into operation on right and proper lines, it has yielded very hopeful results. We have all heaid of the achievements of the Tripli- 'cane Stores in Madras. In Bengal also there are stores which have worked and are working very well. The Co-operative Store at Gosaha (in the Suudor-bans) in the district of Twcntyfour Pargauas in the Zemindary of Sir Daniel Hamilton is a striking example showing how co-operative concerns may be successfully managed. There are a few other stores in my province which have yielded similar results. In Bengal two societies have recently been formed, one in West Bengal in the neighbourhood ef Calcutta and another in East Bengal, for the supply of electricity. The societies have just been formed and the lesults of their working will be awaited with interest.

The co-operative milk movement in Bengal is a producers' movement The little that has, however, been done there for the promotion of the co-operative supply of milk is very encouraging. Calcutta is not the only place in my province where we have such a society. The Co-operative Milk Societies Union in Calcutta has as its members primary milk societies in the immediate neighbourhood of Calcutta outside the limits of municipal jurisdiction. But elsewhere at Darjeeling and at Dacca also unions on the Calcutta model have been started. In fact the demand for the formation 'of such societies is so great that the staff at the disposal of the Co-operative Department is quite unequal to meet the situation. Those who have taken pains to scrutinise the working of these societies since their inception will bear testimony to the excellent results achieved by the movement. This has induced the Corporation of Calcutta to come forward to help it by rendering financial assistance with which the Union has been able to set up up-to-date machinery for pasteurisation and other modern scientific methods of treating milk before it is placed before the consumer for use. The methods employed by the milk societies have enabled them to improve their cattle, increase their productive capacity and introduce improvements in various other directions. In fact the Imperial Dairy Expert of the Government of India, Mr. Smith, is most eloquent in his praise of the system adopted by the co-operative milk societies in Bengal. We find the Royal Agricultural Commission commending it to the notice of the general public. "The experiment of this Calcutta Co-operative Society", they write, "shows what can be done by very small producers situated near railways and engaged in a high class trade. As a first contribution, to the solution of the difficulties experienced by urban consumers, it is worthy of imitation wherever possible. Municipalities should follow the lead of the Calcutta Corporation encourage the formation of central distributing societies and endeavour to arrange for groups of societies in all localities suited for milk production and having a' good rail service." I have referred to this subject at some length because the problem of milk supply is not a local problem and it is a problem, in the proper solution of which we are all vitally interested. If the Calcutta plan is a success, I do not see why it should not be tried elsewhere. The co-operative movement should now be strong enough to tackle the problem independently without waiting for help from Government when it is not forthcoming and follow the policy which Denmark has adopted in the matter.

It will not be diffcult for you to realise that if the economic condition of the vast mass of our rural population is to be improved by co-operative methods and effective and energetic measures are to be taken for such improvement, the agency required for this onerous work is not available. The staff that the Provincial Co-operative Departments have at their disposal is generally meant for credit work. For experiments in new non-credit directions competent men with special qualification and an adequate number of such men are required. For the promotion of irrigation societies you require engineers, for milk societies you need properly trained experts conversant with the various scientific processes required for the treatment of milk; for health societies you require trained sanitarians; for sale and supply societies you require trained men with business aptitude, and for all these you need honest men, having love for their work, conversant with the principles of co-operation and devoted to the co-operative movement. The question now is. where and how are we-To get such men? This brings me to the question of education and co-operative training.

The striking progress of the co-operative movement noticed in Western countries is due principally to the great emphasis that its promoters place upon its educational aspect. As you must all be aware, the Rochdale Pioneers resolved that apart from the modest subscriptions of their members the entire surplus of their mutual trade should not be distributed to the members but should be kept partly as a reserve and devoted to the extent of $2^1/_2$ per cent for the promotion of education. "The education that they had in view was that of instructing the community in the advantages and benefits of co-operation, that is to say, in genuine propaganda for the ideal, and afterwards when the recruits had become established members of their society, in training them to become real co-operators".

Mr. Goedhart, to whose article I have already referred, points out that by following this method, co-operators in England and elsewhere in Europe have "obtained the means of developing their movement and extending its ramifications from the supply of food to clothing, housing, credit, insurance, indeed to the satisfaction of practically every human need", and that "the organisation of wholesale co-operative trading and productive enterprises under the control of federated consumers societies, and the import of nearly every kind of goods have become the ordinary activities of a well-organised co-operative movement in nearly every country."

"This vast extension of activity and successful growth has not been undertaken merely in order to obtain a greater margin of 'profit' or surplus, but in order that co-operators might make the movement they love, serve the common good of everybody and thus raise human society to a higher level. Those who have not understood the true basis of the co-operative movement, or who were too much prejudiced against it to ascertain the truth, have entirely misrepresented Co-operation, and not the least in those cases where they have wished to limit its province to the amelioration of conditions of life to the poorest and most unfortunate. No, it has not for a few of human kind that Co-operation was intended to be the noblest means of improvement but for all.

"Each for all and all for each is the universal motto of the movement, and clearly indicates that Co-operation was and is, the practice of the idea of social solidarity. Very slowly this idea has become understood amongst thinking men. So was it understood by the great William Ewart Glastone, who once said to Sir William Maxwell, 'So long as you cling to the principles of Co-operation I am without fear for the future of my country. The help which a man gives to himself is always the best."

It is true that some of the Provincial Co-operative Institutes and Registrars of Co-operative Societies in India have now begun to realise the importance of improvement and extension of education and training with reference to the proper diffusion of co-operative principles in their areas and have turned their attention to the solution of this emergent problem. But all that they have attempted to do so far is nothing better than a mere tinkering with the question.

The whole problem of education has such an important bearing on the future development of the country in all its varying aspects, social, economic, political, moral, sanitary, that 1 hope you will hear with me a little longer if I dilate on the subject, which is one of such absorbing interest to many of us.

You cannot but admit that the intent and purpose of the modern economic system is totally incompatable with the spirit underlying the co-operative movement. For, while the guiding motive of the present economic system is profit and material gain, the co-operative movement stands for communal service, equality and brotherhood. Human institutions in a society are, barring special cases, moulded and shaped by the ideals and traditions that inspire the general body of population. This is true no less in regard to educational institutions than to others.

It is futile to expect any rapid and proper development of the genuine co-operative spirit so long as India is not able to introduce a system of education of her own,—which the present system is not,—a system of education which should besides be in consonance with the spirit and guiding motive of the co-operative movement.

I must make it clear that by education I do not mean mere literacy. A proper system of education if it is to fulfil the objects that a national system of education in a country fulfils, should be related to the real life of the people concerned and be suited to their needs and requirements, It should help them in achieving their aspirations and developing their character in accordance with their ideals. This purpose cannot be served by an educational policy not formulated by the children of the soil and imposed on a subject race for reasons of administrative exigency.

I will illustrate my remarks with an anecdote that the great American industrial leader, Henry Ford, relates in one of his two remarkable books "My Life and Work" and "Today and Tomorrow". A highly educated Persian who, we are told, had taken several degrees both in Europe and America, was the master of many languages and had finished four years of special work in one of the leading American Universities, was some time ago on a visit, before he returned to Persia, to one of Ford's Trade Schools, the object being to find out how he could help his fellow countrymen. Ford had at that time under his employ a large number of Persians along with students from other Asiatic countries. At the close of his visit the Persian made a significant confession to the Director of the school. He said to him, that he had begun in words and ended in words and that when he would go back to his country he would have nothing to offer to his countrymen. This was the plight in which many of our youths, whether educated in this country or in foreign lands, found themselves at the threshold of their lives; and it was time efforts were made to remedy this deplorable situation by hold and drastic methods.

While dealing with the problem of education and co-operative training, we must bear in mind the fact that if co-operative societies are to devote their attention only to the solution of the problem of primary education. as some co-operative societies appear to be so minded, the benefit accruing -to the community therefrom would be realised, not presently, but, perhaps, partially, at a distance of twenty or twenty five years hence. What therefore, is needed, is that a well-considered scheme of adult education should be devised and efforts should be made to bring it into effect at once and that steps be taken to introduce such education all over the country on an extensive scale. As the Report on the Royal Commission on Indian Agriculture states, "such a development would antedate by at least a generation that great advance in literacy which in our view is essential to progress in all directions".

In addition to this, steps should further be taken for the training of the staff employed for carrying on the work of co-operative societies of all descriptions. This work should be undertaken by the co-operative movement itself when adequate Government assistance is not forthcoming. The co-operative movement in India should now become more self-reliant and efforts should be made for releasing it from the leading strings of Government Departments. If the co-operative movement in this country is to be a real, popular, national movement, that we all desire that it should be co-operative societies and their spokesmen should adopt methods that have made it so elsewhere and have at the same time enabled its promoters to run it as a beneficent movement, conducted, on independent and up to date business lines in Western countries.

There is a small book entitled "Co-operatiou in Denmark" published by the Co-operative Union, Manchester, of which the authors are Lionel Smith-Gordon' and Cruise O'Brien, which, I am sure, many of you have read. The writers state that before the rise of the co-operative movement the Danish peasant was almost a serf and the agricultural industry was threatened with grave danger, if not extinction. The book shows how by co-operative methods the economic condition of the country has been transformed almost beyond recognition in this short space of time and Denmark at the present moment is regarded to be one of the most flourishing among the countries of the world and her peasantry are a happy and contented community.

The Sixteenth Bombay Provincial Co-operative Conference

In his excellent though brief introduction to a recent work on "The Folk High Schools of Denmark and the Development of a Farming Community" Sir Michael Sadler describes in his inimitable way the circumstances that have contributed to the remarkable change in the tone and temper of the rural population of that country as also to the phenomenal development of the co-operative movement among them. "The farmers of Denmark have." Sir Michael states, "won the admiration of the world by their alert courage in quickly adapting themselves to changes in economic opportunity and by the intellectual and moral power which they have shown in their successful achievement of many-sided co-operation", in answering the query : to what is due this remarkable transformation of a people who before the introduction of the co-operative movement were " * * * unprogressive; sullen and-suspicious ; averse from experiment; incapable of associated enterprise" ; Sir Michael says : "The secret is open. Character, as Goethe said, makes character. A group of greathearted patriots moved their fellow countrymen by their teaching and by their example. Their teaching was not occasional but systematic; and their precepts were distilled in corporate life. Danish experience confirms the truth of the epigram; "Educational bands make the strongest ties,"

I know that our difficulties are more arduous, our hindrances much greater. For we have to contend with our numerous indigenous, internal troubles, besides attempting to extricate ourselves from the paralysing grip of a foreign bureaucracy, joined to the benumbing embrace of a soul-killing economic system. But no hindrances are so enormous that they cannot be overcome, no obstacles so immense that they cannot be sin mounted. Where others have elsewhere succeeded in conquering difficulties similar to ours, there cannot be any reason why we too should not succeed. The enterprise in which we are engaged is one of the noblest that can engage the activities of man.

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[*] Presidential address at the 16th Bombay Provincial Co-operative Conference, Bombay, March 2, 1929.

Courtsey : P.C. Ray Museum, Chemistry Dept. Calcutta University

II

Bengal Chemical and Pharmaceutical Works.

AN ANGLO-INDIAN APPRECIATION.

"Business," an Anglo-Indian Journal writes :—

"The Electric Company would not give us power. We required a fan, so we made that," was the reply I received to my question about the unusually pretty looking fan that was whirling above the head of the Manager. It is a small two-bladed fan, run by a pulley and a string and works most efficiently as the temperature of the room gives evidence.

That fan is a symbol of the works. Nothing daunts these manufacturers They know what they want and they get what they want—somehow. They seem to have a peculiar habit of riding roughshod over all obstacles and "getting there" as the American expresses it.

Situated picturesquely on the outskirts of Manicktolla suburbs, far from the harassing jurisdiction of the nearest sleepy municipality, the factory of the Bengal Chemical and Pharmaceutical Works stands as a monument to the ingenuity and resourcefulness of a few men who are determined to do the things that others have only dreamed or talked about. The Master Mind here, who "dreamed the dream and is making it come true" is Dr. P. C. Bay, D.Sc., Ph.D., F.C.S., and he is well assisted by the men whom he has trained. The first thing that strikes one are the compact neatly built quarters of the officers and the rows of clean looking buildings above which smoking chimneys tower, which tell of the activity within. Everything around is clean, in fact so spotlessly clean, that one fails to realise that work is going on ceaselessly, for one always associates factories and manufacturing with black grease and dirt and dirty looking men, with soiled clothes, soiled hands and soiled, blackened faces.

The factory is not like other factories. There is machinery here; plenty of it, but not the kind of machines that one sees anywhere else.

Most of the special machinery has been though-out, designed and made in the works itself, to suit the purposes-and requirements of the company. For instance, the lead chambers. This was not bought or imported : it was thought out be the assistants and put by them, although they are not engineers : and so successfully and efficiently they have done it, that to-day they are the largest manufacturers of sulphuric acid in India. The engineering problem was not the only difficulty, they had to obtain lead-coated iron sheets, which could not be bought in India. They could not import it on account of the war. They had to make it. They did not know how to make it, but that did not please them. They set about doing it, experiment after experiment was made, failure after failure faced them but these were not the men to "give up." ingenuity combined with observation and persistency conquered. They made the lead-coated sheets–and the sheets are good. Then came the trouble of putting these sheets together. They could not be soldered, the sulphuric acid corroded the solder. They had to sweat the sheets together, which required a special process that they had to discover. To-day they are experts in coating iron sheets with lead and joining them together without solder. This fact has enabled them to put on the market the Fire King, fire extinguishers, which they are turning out as fast as they can to supply the Government order for them. They are now thinking out ways and means to turn them out faster, so as to meet the growing public demand for them. Five hundred hand-fire extinguishers are going to Government every week.

The latest mechanical achievements are the packing and compressing machines for bandages and medicated absorbent cotton that the Bengal Chemical and Pharmaceutical Works are supplying for war purposes. They have invented and made no less than four special machines to do this work, and improved one machine that they succeeded in obtaining from England. Two and a half yards of guaze by 36 inches wide is compressed into a package 25/8 inches by 15/8 inches by 13/8 inches and it is hard enough for the Red Cross to use in self-defence as a missile against the Hun. It is easy enough to make the bandages and impregnate the cotton with drugs, but the trouble was to compress and pack them. They were ready to buy machinery, but they could not get them. They did not have any idea about a packing machine. They had never seen one. They had to pack the goods properly, for they had a Government order and they also wished to do their "bit" for the war. So they just thought it all out, machine and all, even the method of packing, for field dressings cannot be packed in the ordinary way there is a peculiary way of doing it. Sounds easy, and it was told me in the most off hand and casual manner; but it is not all so easy to solidity imagination into steel of given or required shapes and convert abstract ideas into concrete, efficient, working steel systems or machines. They transformed an ordinary hacksaw into an automatic knife to cut rolls of bandages into required lengths; they turned ordinary oil drums into disinfecting chambers ; they made compressing machines out of bits of steel bars and a screw. And so goes the tale. The factory is full of small and big machines that have been practically invented and wholly made in the works.

I do not attach much value to the fact that the works cover ten acres of land, or that they have so many hundred workmen, or that they have a machine shop, a foundry and pattern shop, a department for making their own packing cases and a press to do all their own printing; money can buy equipment and any company with enough capital can put up a modern, fully equipped, up-to-date factory; all these have their value as-the concrete results of daring enterprise and continued effort but greater than all these is the undaunted spirit, the intelligence and the resourcefulness, that would not be made bankrupt, which is expressed in all these and pervades and permeates the whole establishment.

To-day the standard of civilisation is measured by the output of machinery in the country, and the standard of efficiency of a factory is to be measured by the quantity and quality of the output. By this standard alone the ssaff and the working force of the B. C. and P. W. is most efficient; but that would be nothing remarkable, did we not know that these young chemists, the raw and inexperienced—and inefficient—products of an unpractical University have trained themselves to a pitch of excellence that they cannot only compete but dominated in their special lines. It is worth ruminating on. I met a number of the managing staff, they were silent men. The Manager, Mr. Rajshekhar Bose, took me round. I was with him over three hours and it was most noticeable, that perfectly courteous hospitable and ready to show and inform me about everything,, he did not speak a superfluous word. It was the same with,, the Works Manager, Mr. Dass Gupta, and all the other officers whom I met. There was silence in the office, a thing that is not so common, and it was not a forced silence, for everyone was busily concentrated on the work in hand and they seemed interested in it.

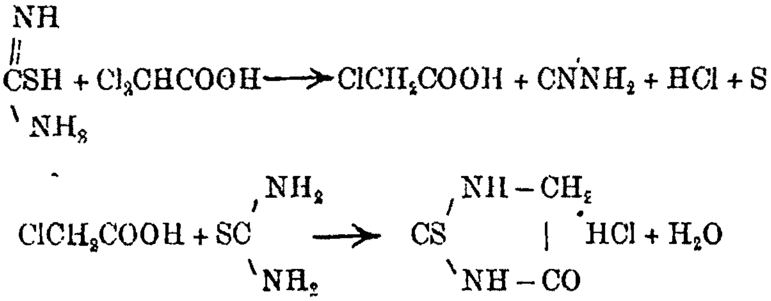
Mr. Bose, the Manager, informed me that some of their staff were going to foreign countries after the war to learn how in those countries manufacturers had overcome the problems that faced them. It seems to me the better plan to go to study abroad after gaining some practical experience here and knowing exactly what requires the greatest attention, fthan to go before one knows what is to be demanded of their knowledge

The Bengal Chemical and Pharmaceutical Works have shown what Indian intelligence and local training can do, and they should be considered the true pioneers of a new industrial era in which enterprise is not supported by the charity of the Government or of unpractical philanthropic enthusiasts, who have more money to spend than ideas about the development and growth of industry and commerce. Tata has shown us what enterprise plus capital can do; the Bengal Chemical and Pharmaceutical Works have shown India what enterprise plus resourcefulness can do. They are both wonderful examples to an eager nation clamouring for recognition, industrial growth and a greater participation in the affairs of the Great British Empire. Such are the true leaders of the people and the builders of nations.

Essays and Discourses by Dr. Prafulla Chandra Ray, pp. 315-318. (first edtion–1918)
Courtsey : 1st Libary with the co-operation of Professor J. Chattopadhay.

Science

colour, probably due to some impurity. On analysis the substance is found to be the same compound, namely ψ-thiohydanation hydrochloride. Evidently, during the first stage of the reaction mono–chloracetic acid is formed which interacts with thiourea to form the compound in the usual way thus :–



$$\mathrm{\overset{NH}{\overset{\|}{C}}SH\underset{\setminus NH_2}{} + Cl_2CHCOOH \longrightarrow ClCH_2COOH + CNNH_2 + HCl + S}$$

$$\mathrm{ClCH_2COOH + SC\begin{smallmatrix}/NH_2\\ \\ \backslash NH_2\end{smallmatrix} \longrightarrow CS\begin{smallmatrix}/NH-CH_2\\ \quad\quad |\\ \backslash NH-CO\end{smallmatrix}HCl + H_2O}$$

In aqueous solution Dixon obtained the same reaction.[*]

With trichloracetic acid, however, thiourea does not at all react at ordinary temperatures in acetone solution. The two substances, when mixed together, crystallise out side by side, with a slight decomposition. By carrying out the reaction in aqueous solution Dixon obtained the trichloracetic acid salt of thiourea.[ψ]

Experimental

1. Thiourea and Monochloracetic acid.

Formamidine-thiolacetic acid hydrochloride. [NH_2. C (: NH). S. CH_2. COO H], HCl. The preparatin was repeated and the substance obtained in a much purer form. Its properties already published[‡] were confirmed. That it was a hydrochloride was further proved by the fact that its aqueous solution gave a precipitate of silver chloride with silver nitrate solution.

0.1936 gave 0.1591 AgCl and 0.2706 $BaSO_4$

Fousnd Cl = 20.33; S=19.20

CalC. for $C_3H_7O_2N_2SCl$, Cl = 20.80; S=18.77

2. Thiourea and Monochloracetic ester.

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[*] Trans. Chem. Coc., 1893, 816 [‡] Loc. cit

[ψ] Ib., 1917, 688.

Interaction of Thiourea with Mono-, Di-, and Tri-Chloracetic Acids and Monochloracetic Ester.

SIR, PRAFULLA CHANDRA RAY, KT., C.I.E., D.Sc. (Edin), PH.D.,
F.C.S., *Sir Taraknath Palit Professor of Chemistry,*
University of Calcutta, and MANIK LAL DEY*, B.Sc.

It has been shown by one of us that in the cold, thiourea reacts with monochloracetic acid in acetone solution, with the formation of the hydrochloride of formamidine thiolacetic acid. If the reaction mixture be heated ψ-thiohydantion hydrochloride is the only product obtained. It was thought necessary to study the reaction of thiourea with other chlorinated acetic acids as also monochloracetic ester. The results obtained are interesting, and show how the reactivity of chlorinated acetic acids in this particular instance decreases with the increase in the number of substituting chlorine atoms. In this connectin it is necessary to bear in mind the well-known fact that the acidity of chlorinated acetic acids increases gradually as further chlorine atoms are introduced.

Although, two different products are obtained in the reaction of thiourea with monochloracetic acid, according as the reaction takes pleace in the hot or in the cold acetone solution, with monochloracetic ester the same substance, ψ-thiohydartoin hydrochloride is formed whether the reaction mixture is heated or not, alcohol being eliminated. This fact has not been noticed by previous workers, although monochloroacetamide has been used to yield the same compound by a similar reaction.‡ Dichloracetic acid, on other hand is very slow to react. At ordinary temperatures the reaction is not complete before a week, and in fact the first crystals begin to appear after four days. The product is a mass of big diamond shaped crystals having a faint pink

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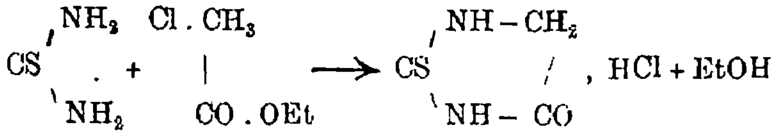
* Trans. Chem. Soc., 105, 2159 ψ Vollard, Annale. 166, 385

‡ Mulder, Ber., 8. 1264; Maly, Ber., 10, 1853.

Equimolecular proportions of thiourea and ethyl ester of monochloracetic acid, disssolved in acetone were mixed together in a flask which was left to itself overnight. Next day a crop of white crystals was found deposited at the bottom, together with a heavy oily liquid which on agitatin solidified to a mass of white crystals. The crystals were collected, drained, washed with acetone and then recrystallised. The substance was found to be ψ-thiohydantoin hydrochlorie. Its aqueous solution gave a precipitate of silver chloride with silver nitrate solution.

In another preparatin the mixture was heated on a water bath with a reflux condenser for twenty minutes. A heavy oil was at once formed which on cooling and stirring solidified to a mass of white crystals. They were identical with the former substance. The yield was



0.1456 gave 0.1260 CO_2 and 0.0500 H_2O; found C = 23.60 H = 3.82

0.1968 gaive 0.1803 AgCl; found Cl = 22.66

Calc. for $C_3H_5ON_2SCl$, C = 23.60; H=3.28; Cl = 23.27.

3. Thiourea and Dichloracetic Acid.

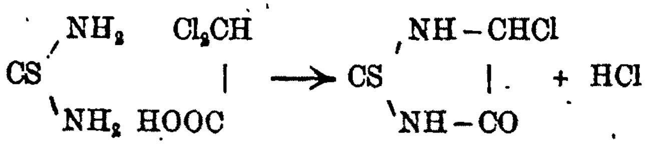
Acetone solutions of the two substances were mixed together in molecular proportions in a conical flask which was left to itself for several dayss, with its neck stuffed with cotton wool, so as to allow slow evaporation. After a week big crystals were found in a thick reddish mother liquor. The crystals were drained and washed with acetone and then with alcohol. They were diamond shaped and had a faint pink colour. They were insoluble in ether, alcohol and acetone but very soluble in water. The aqueous solution gave a precipitate of silver chloride with silver nitrate solution. From the mother liquor which contained various secondary products, free sulphur and thiourea were separated and identified. Sulphur was separated by addition of acetone or alcohol to the mother liquor. It was filtered and recrystallised from carbon disulphide. Impure thiourea was obtained by evaporation of the liquid left after removal of sulphur.

0.1332 gave 0.1260 AgCl and 0.2102 $BaSO_4$

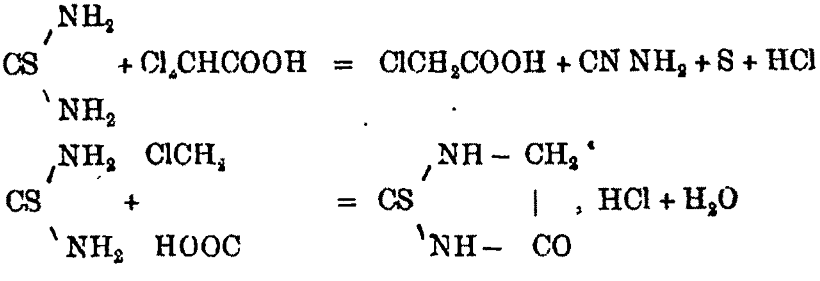
Found Cl = 23.40; S = 21.67

Calc. for $C_3H_5ON_2SCl$, Cl = 23.27; S = 20.98.

The substance is evidently ψ-thiohydantoin hydrochloride. At first sight it appears that dichloracetic acid should yield chlorothiohydantoin according to the following equation :–



But what evidently takes place is represented thus :



By simple analysis it is very difficult to distinguish between the two possible products, since they differ only by two hydrogen atoms. But the presence of bye-products in the reaction mixture, as also the presence of chlorine ions in the aqueous solution of the substance favours the theory of formation of ψ-thiohydantoin hydrochloride. The electrical conductivity of this substance and that obtained by the interaction of *mono*chloracetic acid and thiourea, at same dilution, is practically the same, namely, $\mu_{100} = 251$ and 256 respectively at 25^0c, μ_{100} of pure hydrochlonic acid at the same temperature is 400. Since thiohgdantion is a salt of the ammonium chloride type; its conductivity should be like that of ammonium chloride for which $\mu_{100} = 140$. The experimental data points to the view that the compound is more or less completely hydrolysed into ψ-thiohydantroin and hydrochloric acid.

4. Thiourea and Trichloracetic Acid.

Equimolecular proportions of thiourea and trichloracetic acid were separately dissolved in acetone and the two solutions mixed together, and kept aside for several days at room temperature. After ten days a mass of white crystals was found lying in a thick mother liquor. The crystals were drained, washed with acetone and alcohol and then dried. On anylysis the substance was found to be almost pure thiourea. It melted at 171^0, the melting point of thiourea being 172^0.

0.2218 gave 0.6743 $BaSO_4$, Found S = 41.76

CH_4N_2S requires S = 42.10

The mother liquor was found to be strongly acid, giving all the tests for trichloracetic acid. In fact the two substances did not react at all but the one crystallised out while the other being very delequescent remained as a thick mother liquor.

In aqueous solution, however, Dixon* found a compound which he considered to be the trichloracetic acid salt of thiourea. We have repeated his experiement and confirmed his experiences.

ψ Loc. cit.

In the book tiled, 'Research Papers of Acharya Prafulla Chandra Roy–A comple colletion' published by the present Editor with financial support and partnership with the University Grants Commission, New Delhi, 1st edition dt. 17th Jan, 2006, one hundred and fifty eight research papers of P C Ray, (source of which are joint papers) have already been published in Sir Asuthosh Mukherjee Silver Jublee Volumes (2) Science pp. 63-66 by the Calcutta University.
Courtsey : Librarian, Cental Library, Calcutta University

The International Congress of Applied Chemistry–A lesson for India

Three Thousand representative Chemists recently met together in London to discuss "The many topics of interest and importance that are continually arising owing to the marvellous discoveries which the science of chemistry, both pure and applied, is making from day to day."

Every civilized nationality, except of course india sent delegates to the deliberations of the monster gathering. As regards the subject discussed if it is enough to present below a bare list of the sections with their presidents.

Presidents.

I. Analytical Chemistry, Professor, T.E. Thrope, FRS.

II. Inorganic Chemistry and Allied Industries, Dr. Ladwig Mond, F.R.S.

III) (a) Mining and Metallurgy, Sir Huge Bell, Bart

III (b) Explosives, Sir Andrew Noble, Bart, FRS

IV (a) 1. Organic Chemistry and Allied Industry Prof. W. H. Perkin, FRS, 2. Physiological Chemistry and Pharmacology, Professor Cushny (Vice-President; the Late Dr. Gamgee was President)

IV) (b) Colouring substances and their uses, Professor R. Meldola F.R.S.

V) Industry and Chemistry of Sugar, Sir Richard C. Garton.

VI) (a) Starch, Sir Walter Palmer, Bart

VI) (b) Fermentation, Colonel John Greeton M.P.

VII) Agricultural Chemistry, Dr. J.A. Voelcker

VIII) (a) Hygiene, Sir James Crichton–Browne, F.R.S.

VIII (b) Pharmaceutical Chemistry, Mr. N.H. Martin, F.R.S.E.

VIII (c) Bromotology, Mr. R.R. Tatlock

IX) Photochemistry and Photography, Sir William Abney, K.C.B., F.R.S.

X) Electrochemistry and Physical Chemistry-Sir John Brunner, Bart.

XI) Law, Political Economy, and legislation Affecting Chemical Industry Lord Alverstone, F.R.S.

The world, we mean the world of science, is progressing. India alone refuses to move. It is true there are signs of awakening which presage a hopeful future; but the stupor of ages which overwhelmed her has paralysed her limbs and she finds herself a laggard in the race for life. A fair estimate of the progress of chemical science and of the number of persons engaged in its inverstigations may be made by looking over the index of authors' names; in any issue of Journal of the Chemical Society, say of the month of May last. The total number amounts to 590. It means that as many as 590 Chemists have been silently but steadily working in England and the continent in the laboratories. But this represents a record of a month's work only. In order to arrive at a proper estimate we should strike an overage from a year's index. The number of Chemists actually engaged in original investigtions in pure and applied Chemistry would appear to be simply appaling.

Let us pause for a moment and take stock of all that India is doing all the preparations she is making-to make herself abbrest of the requirements of the times. Judging by the number of ever increasing students of the science courses in the College of Bengal at any rate one would be inclined to think that a change for the better is in store for us. There is however,danger luking ahead and it is incumbent upon us to take timely note of it.

The rush of the science courses is simply bewildering. Some Colleges, I understand, are going to divide them junior science classes-especially Chemistry classes-into two sections; each consisting again of many as 80 to 100 students. The country is thus going to be flooded with a heavy output of graduates in Science. The question now arises; what are going to do with these potential BSc's; and MSc 's? In what manner and they going to be absorbed? What sort of career are we prepared to offer them?

I am afraid the country has yet made no provision for these prospective graduate in science. Any one who has carefully studied the progress of the European Countries during the last three centuries must have realized that non activity has never been continued to any particular sphere. They have advanced all along the line. It is a necessary condition of the real prosperity of a country that science must make headway 'pari passu' with industrial and commercial activity. The Anglo-Saxan race, for instance, has been foremost in navigation, exploration, colonization, and in commercial and industrial activity. The age and country, which produced a Raleigh, a Darke; a Shakespeare, a Spencer, a Hooker, a Bacon did not wait long in bringing forth a Newton, a Robert Boyle. There has been always a demand for the man of science. But the most striking object lesson is afforded by modern Germany, which is par excellence the land of Chemical Industries. There a happy and harmonious co-operation has been established between the plodding man of science immersed in his researchs in the laboratory and the manufacturer the man of business-the owner of huge factories-terming the labour and discoveries of the former to capital account. No such provision exist in our country. Society is an organic growth; it must move and advance as a whole in order to secure healthy development. The Chemist, the Geologist the Engineer, the Electrician may be ready at hand but if the spirit of enterprise is wanting the former will have very little occupation. The law of demand and supply is inexorable. It is thus painful to contemplate the future of our young aspirants for scientific degrees.

I fear the mania, for I can not characterize it otherwise, for the science courses is born of hasty, ill considered notions. It is at last dawning upon us that nation can not live upon law, medicine, engineering and the other "learned professions" neither can it thrive upon quill-driving. There has thus been a revulsion from the mere "Arts" education. The guardians of our boys have a sort of ague, nebulous idea of what they ought to do for them seeing that there is no cancer open to their wards if they take to mere "literary" education they have now conceived a sudden fancy for scientific education "what shall we do with our boys"? is becoming a serious problem day by day. The hope is naturally entertainted that an education on scientific lines with chemistry as its backbone will enable them some how or other to develop the resources of the country, to create or open new industries.

But unfortunately new industries do not drop from the heavens like gentle rain. The Germany of today is no doubt the land of Chemistry and Chemical Industries. But we clean forget what mighty efforts she and her devoted sons have putforth to make her what she is. A century ago Prussia, for united Germany then existed only in the dreams of her patriots, was in a backward state as regards progress of scientific knowledge. In fact, her very national entity was in jeopardy as she lay prostrate at the feet of Napoleon. At the beginning of the twenties of the last century two of her noble and devoted sons, however, took to the study of Chemistry. It is a remarkable fact that they could learn only the elementary principles of the Science in the land of their birth. Friedrich Wöhler proceeded to Stockholm to sit at the feet of the great Swedish Chemists Berzelius and Justus Von Liebig repaired to the laboratory of Gay Lussac at Paris. These two great chemists, after returning to their native land worked in happy and harmonious cooperation and for half a century started the scientific world by their epoch making discoveries in the province of organic Chemistry, namely synthesis or artificial production of new components. The fire which these mightly chemists borrowed Promethus–like from abroad Set all Germaby ablazed Indeed, it is too much to say that almost all the eminent Chemists of Germany from 1827 to 1877 have been the intellectual descendants of Liebig and Wöhler. If Germany is today reaping a rich harvest it is because of the unselfish devoted and whole hearted labours of generatons of Chemists for nearly a century.

The silent work of the student of Science at the laboratory as a rule passes unnoticed; but its results are often more far-reaching that any of the "decisive" battles of the world. To give one or two instnaces. Let us take the case of Turkey–red dyeing. Says Professor Thrope :

"The story of the artificial formation of alizarin from coal tar derivatives by Gaebe and Liebermann in 1868, and of its successful commercial manufacture by Perkin in this Country, and by cars in

Germany is to well known to be repeated here. The synthetic formation of alizarin created nothing less than a revolution in one of our leading industries, and completely destroyed a staple trade of France, Holland, Haly and Turkey. Alizarin is one of the main products of medler plant, the roots of which have been used from time to time immemorial for the sake of the dyes which they contain. Phiny tells us that in his time madler was well known "to the sordid and avaricious and this is because of the large profits obtained from it owing to its employment in dying, wool and leather. Originally it was grown almost exclusively in India, Persia and Levant. The moors introduced it into Spain, whence it found its way into the Netherlands. Alsace and Avignon were long celebrated for their madder. Twenty years ago it was the most important of the natural dye-staffs used by the Calicoprinter and Turkey red, dyer; and the annual report of it into this country was valued at (pounds) 1,250,000 starling, the South Lanarkshire district alone consuming upwards of 150 tons weekly. The Chemists has changed all these, and the Cultivation of the various species of the Rubiacea for the purposes of the dyer, which has continued for thousands of years down to our own time, is now practiclly at an end. It is the remnant of a primevial vegetating that has displaced the vegetation of to-day."

Synthetic or artificial Indigo also from Coal-tar, was discovered mainly by the labours of Bayer.

Here also the stimulus imparted by the Chemist at his laboratory in Germany has its reflex action painfully felt by the Indigo planters of Behar. Take again the fate of the nitre or saltpeter industry. Since the days of the East India Company up till recent years, Bengal has been foremost in the exportation of this article. But the discovery of immense deposits of sodium Nitrate of Chili Saltpeter has led to a considerable falling off in the exportation of Bengal Saltpeter. The vast income derived by the Republics of South America in the shape of royalties on this mineral resource amounting we believed to several million pounds sterling, is however threatened with extinction. Nitric acid and the nitrates are now being successfully manufactured from the air.

Those who wish to take to the study of chemistry must not approach it with a light heart. A life long unflagging zeal and devotion is necessary in order to achieve anything worthy the name. This is an age of intelectual competition. That country which can produce the largest number of brain workers will in the long run come off victorious. A very large number of students have been attracted to chemistry from purely mercenary motives. As Emerson truly observes : "The history of man is a series of conspiracies to win from Nature some advantage without paying for it." The goddess of science does not, however condescent to appear before a false unfaithful worshipper. More than a thousand years ago the precursor of Indian Chemists, the celebrated Nagarjuna, after years of devotion to his favorite subject exclaimed :

"dadashani cha barshani mahakleshaw kriti maya

* * *

yadi tunganshi may devi Sarbada bhaktabasale.
durlavong tishu lokeshu rasolantang dedas me II"

"For twelve years I have gone though several penances [i.e. assiduously pursued the subject! Goddess if thou art propitiated, be please to communicate to me the rare knowledge of chemistry."

It is too much to expect that the Indians, descendants of the Rishis of old should take to the pursuit of knowledge for its own sake?

"Vide History of Hindu Chemistry" vol II introduction XI, also page 7 and Sanskrit texts page 13.

Source : The Modern Review. August, 1909. pp. 127-130

Sciences and Civilisation

Our age is pre-eminently an age of science. It has been rightly observed by a great English writer :— "Modern civilisation rests upon physical science; take away her gifts to our country; and our position among the leading nations of the world is gone to-morrow; for it is physical science only that makes intelligence and moral energy, stronger than brute force." The recent war has amply demonstrated the truth of these observations. While Europe, America and Japan have taken to the fields of science with singular vigour and activity, how does the land lie about us in India? The situation fills our mind with sorrow and shame, and you will excuse me if I enter into a short history of the subject.

Indian culture has been from time immemorial of a peculiar cast and mould. It will not be quite wrong to say that the Hindus are pre-eminently a metaphysical nation. Not that the cultivation of physical science was entirely neglected in India's ancient days, but it proceeded as an adjunct to the study of metaphysics and relgion. From the time which marked the decline of Buddhism commenced the dark ages of India, and for the last 1,000 years or more India has been a "tabula rasa" so far, as the cultivation of physical sciences is concerned. In Europe, the lamp of science has been burning dimly from the time of Paracelsus and Basil Valentine and Galileo, Newton and Boyle, but more and more brilliantly in the 18th and 19th centuries. We in the East, on the other hand, have been living all this time in silent and ecstatic meditation.

It could not be expected that, with such a bent of mind of the people, there should have been much activity for the cultivation of the physical sciences in this part of the world. Besides, with the decay of the anceint Hindu and Buddhistic culture, an intellectual torpor took possession of the Indian mind and the spirit of enquiry after truth rapidly declined. Authority of the Shastras took the place of reason and clouded human intellect. A state of mind was thus fostered which was inimical to the study of science which accept things not on trust but by verification.

Indian mind lay in this condition till the beginning of the nineteenth century when new conditions of life arose out of the establishment of British rule. This contact with the West brought in new ideas and new modes of thought in India life. The introduction of Western culture was beset with many difficulties and encountered great resistance at the start.

We stand to-day at the threshold of a critical period in the history of our country. The war happily terminated, and we are in the midst of rejoicings over the Peace celebrations. It has been truly said that the late war called for every ounce of scientific knowledge and effort, that the geat nations have been starining their utmost and, that the scientific battle has been fought by the laboratory men. Indeed it was from the nitrogen of the air out of which Germany manufactured synthetic nitric acid and thus defied the world for four years and more in spite of the stringencey of the blockade. It is now becoming abundantly clear that the fate of a nation will hence forth depend more upon of science than upon the skill of its generals or the adroiness of its diplomatists and statesmen.

It is sad to reflect that nothing short of the cataclism of the late Armageddon could rouse us from our stupor and make us realise that like so many other countries, India must be not only self-contained in the production of her own requirements, but learn to convert her vast supplies of raw materials into manufactured products. India has now an enormous amount of lesway to make up. We must not put forth all our energies and make vigorous and sustained effort so as to be able to stand a fiarce world competition.

Unfortunately, educational progress cannot be effected piecement and at a moment's notice. It is almost a truism that the nations which have made the greatest advance in science are precisely those which have made ample provisio for the spread of education among the masses. Primary, secondary and higher education all go together. In fact, America has now authoritatively laid down the dictum that education is the birthright of every citizen. Speaking of education in

India, Sir Michale Sidler has very aptly observed that you must broaden the base of the pyramid, but not whittle away the apex.

A widespread diffusion of primary and secondary education among the dumb millions is the only means of making them rely on their own reasources. Without this foundation of primary and secondary education, it is not possible to make any substantial progress in the study of science or its practical application in the field of industry in the country. This is the great handicap imposed on us and it makes itself felt in all directions of life.

I feel it my duty to take a rapid survey of the future of science in India, and suggest steps which ought to be taken for the proper culture and development of science in India. By this I mean that educated Indians should take a greater part in original investigation and steps should be taken for the diffusion of scientific knowledge among the rank and file of the people The cultivation of science must be entrusted, as is the case everywhere in the civilised world, to the professors in colleges and universities, to the teachers in the secondary schools and to the officers in the various scientific departments of the State, and there must be a good proportion among the intelligentsia in the country to take interest in the pursuits of science and encourage its votaires.

Let us now see where the fault lies. The scientific services of the Government are posts of great value, prospect, and security, they afford to their holders unique opportunities, rare and valuable materials for study and investigation. But with what studied care the Indians are excluded from these services will appear from the following table* compiled from a recent Government report.

While the study of science is essential to our material advancement it has a special need and significance for the culture of Indian youth. A long period of intellectual stagnation, as observed before, has produced in us a habit of dependence on the authority of the Shastras. Reason was bound to the wheel of faith and all reasoning proceeded on assumption and premises which it was not open to any body to call in question or criticise. Intellectual progress was handicaped under these conditions and it is no wonder that India cannot point to any notable achievement in this line during the 1,000 years that preceded the advent of British rule. Reason has thus to be set free from the shackles and the function of science in achieving this end is indisputable. Science takes nothing ontrust but applies to them all the methods of investigation and criticism. I look forward to the growth of this scientific spirit in our country to liberalise our intellect. There is no lack of capacity amongs our young men: what are wanted are patience and tenacity of purpose. Science, as Huxley said, requires the virtue of self-surrender. You must patiently observe and interprets the phenomena and events. There is no room for a prior reasoning in the realm of science. The attitude of a scientific mind has been very aptly described by Faraday :—"The philosopher," says he, "should be a man willing to listen to every suggestion, but determined to judge for himself. He should not be biassed by appearnaces; have no favourite hypotheses; be of no school; and in doctrine have no master he should not be a respected of persons but of things. Trust should be his primary object. If to these qualities be added industry, he many indeed hope to walk with the veil of the temples of nature." It should be the aim of our young men to develop these qualities and nothing is more helpful to their development than the study of science itself—*From the Presidential Address to the Indian Science Congress.*

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* The table is printed elsewhere.

The Indian Review, Dec 1920, pp. 89-90
By Courtsey : Chaitanya Library

The Bearing of Dr. Meghnand Saha's Researches on the Problem of Cosmic Evolution

During the middle ages in Europe, all geographical books began with a map of the world with Jerusalem as the centre of the earth and consequently of the universe Childish as such ideas may appear to us now, they illsutrate a tendency in all ages running through the humanmind—namely, to understand the position of man with respect to the phenomenlal world, and to build a picture on the avilable knowledge. In all those attempts—whether they were made on the banks of the Nile, the Tigris or the Ganges, whether in classic Greece or medieval Rome, man was obsessed with a ridiculous idea of his own importance, and his ideas of geography and cosmogony were tainted with his own religious beliefs.

There is nothing to choose between these theories. In the light of modern knowledge, they are all equally puerile. 'Jerusalem or Mecca, Mount Olympu or the Himalays can no more claim to be' called the centre of the world than any Negro village in the interior of Africa.

The universe of facts is the result of century long studies by savants of all ages, and is truly an international achievement. It was preceded by a knowledge of the shape of the earth, which we owe to the Alexandrian savant Eratosthenes. We know that this earth of ours is only a tiny piece of pebble in the vast space. Its parent is the sun. from which it separated millions of years ago, as a tiny spark is thrown off from a mass of coal on fire. Life, vegetations, man—are the result of a process of cooling extending over millions of years.

A new celestial 'Geography' has succeed the older fanciful geography of Ptolemy, and how the old ideas have been clean swept off will be manifest from one example. In ancient and medieval times, the curiosity of man to know the origin of the myriads of stars shining about us gave rise to many enjoyable stories *e.g.*, the stars are the souls of some departed heroes who, as reward for their meritorious deeps, have been allowed by the Gods to have a place in the firmament.

But alas! at the touch of the Goddess of Science, all these stories have vanished like so many day-dreams! We now know that each one of these stars is a sun, some smaller but most larger than our own sun, each having its own family of planets, probably people with rational beings like ourselves, each with its own set of warring nations and intriguing politicians! By applying the same method by means of which a surveyor determines the distance and height of a far-off tower or hill, the astronomer can measure the distance separating us from these stars.

This riogonometric survey of the heavens, first begun by Bessel of koningsberg in 1839, is still being carried out according to well laidout plans in all the chief observatories of the world, on a basis of international co-operation. They tell us a really wonderful tale; they show, at the same time, how small is man, and yet how big is the intellect! Our nearest stellar neighbour, alpha-centauri, a first class star in the southern heavens, is twentyfive billions of miles distant from us. Even light, which in a second covers nearly 2 lakhs of miles, and takes only eight minutes to reach the earth from the sun, takes full four years and a half to reach us from our nearest stellar neighbour. Space is full of apparently an unlimited number of such island universes. I say "apparently", because Professor Einstein has recently cried halt to this idea of the limitless extent of the universe. He holds that the physical universe, though unbounded is not limitless—the "total number of island-universes not exceeding 10^{21}, which is of the order of thousand trillions.

In spite of the immensity of the universe, the same laws with which Newton unlocked the mystery of planetary motion are found to govern these distance worlds. Thousands of such worlds were discovered by the great explorer of heavens,—Herschel, but in none has the law of gravitation been found non-existent. This is an instance of the fundamental identity of physical phenomena.

THE NEW HEAVENS AND THE NEW COSMOGONY.

The overthrow of older ideas left a blansk in man's mind. But "Nature abhors a vacumm", and it was not long before Kant and Laplace hastened to fill up the gap by their famous Nebular Hypothesis, The influence of this hypothesis on the subsequent course of science can be illsutrated by the following episode.

In ancient times, two cleaver Greeks, Daedalus and Icarus, father and son, are said to have built wings, and cruised through the sky. Daedalus kept himself near the earth and successfully performed the journey. Icarus was more ambitious and wanted to reach the sun. But on close approach to the sun, the wax of his wings melted and he fell into the sea and was drowned.

In science, too, a theory which attempts too much, runs the risk of sharing Icarus's fate. But closer scrutiny will show that Icarus's failures are more valuable to mankind than Daedalus's triumphs. Daedalus confining himself to low heights, cannot see more than the man on the earth. Icarus, in this soaring cruise, comes across new gain to man's store of knowledge,surviving his own fate. Many people would liken the nebular hypothesis to Icarus's journey, and would predict for it the same fate. But be that as it may, it was a sublime thought, attempting to bring within one compass the knowledge of the heavens brought to light with the aid of Galieo's telescope, Newton's law of gravitation, and Herschel's survey of the heavens. Within the last hundred years, it had many ups and downs, but has been, on the whole, able to retain its ground, and meet thie demands arising out of new discoveries.

Laplace postulated a theory of stellar evolution, from a primordial nebular mass by a process of graudal contraction. The contraction is the result of mutual gravitational attraction of the nebular gas, attended by the spin of the whole mass round an axis. Laplace never saw the nebulae himself, and it is doubtful if he ever pictured to himself the various stages of his worlds in the making. The nebulae were first photographyed by Lord Rosse with his giant telescope in 1840; after that thousands of them have been discovered by enterprising European and American observers, many of them showing the spin, the structure, and nucleii of condensation predicted by Laplace.

The study of the various stages of evolution of the stellar worlds remained unsolved till 1860. The stars are presumably quite as big as the sun, or much bigger, but such an immense distance separates them from us that even in the biggest telescopes they appear as mere specks of light. With the apparatus at our disposal before 1860, it was like attempting to scan the coloured lines on a child's marble with the naked eye from a distance of one mile.

Yet this seemingly impracticable step was rendered possible by the discovery of spectrum analysis by Kirchoff of Heidelberg in 1860. This method, it is well known, enables us to determine the constituents of any luminous mass by analysing the light emitted by it, under the influence of heat or electricity. Every element, when excited by the electrical spark, or placed in the flame or the electrical are, emits light of a particular colour. If it is seen through a glass prism, the colour is characteristic of that element. Every element has its own array of lines, which is as distinct from the set possessed by another element, as the finger print of one individual differs from that of another.

Thesolar light, when it is seen through a prism, gives the well-known colours of the raibow. But closer scrutiny shows that this specturum is corssed by a number of fine, dark lines. They wre detected by Fraunhofer of Munich in 1814 and, for a long time, were a source of great puzzle to the scientists. Aftrer wards it so turned out that they were the hieroglophics in which the sun-god has written out his own story.

The decipherment was accomplished by Kirchoff, the Champollion of the stellar worlds. He showed that many of the dark lines were identical in position with the lines of known elements; for example, the lines called by Fraunhofer D were the same as the few lines seen in a sodium flame. Kirchoff argued that this shows that sodium is present in the atmosphere of the sun.

"Once the ice was broken", began the race for the pole! Kirchoff himself identified iron, calcium. strontium, nickel, cobalt and about ten other elements in the atmosphere of the sun. The astronomers who followed him, notably rowland of America, discovered no less than 20,000 lines, but of these only 6,000 have been identified.

Let us now pause for a while to consider the bearing of this discovery on the problems of stellar evolution. The earth is only a fragment of the sun, so the sun ought to show the very same elements as the earth. The earth is composed of 92 elements, but in the sun we get only forty. To take one example, in the alkali group, we have lithium, sodium, potassium, rubidium, and caesium, In the sun, the lines of sodium are very prominent, lithium can be identified, and potassium is very feebly represented. But not the slightest trace of rubidium or caesium can be found.

This is no the whole discrepancy. The chief constituents of the crust of the earth are oxygen, silicon, iron, carbon, aluminium. In the sun, on the other hand, oxygen, silicon, carbon, aluminium are represented by rather faint lines. Iron, calcium, nickel are represented by numerous sets of strong lines. In other words, there seem to be no correspondence between the compositon of the sun and that of the earth.

The sun in only one of the numberless stars, by no means distinguished above its fellows. There are other stars which, if they were brought to the same distance as the sun, would outshine it by at least a thousand times. Are these bodies made up of the same elements as the earth?

This means a Physical Survey of the heavens on a stupendous scale. It was first initiated by Sechhi in Italy, but carried out by Lockyer in England, and Pickering in America. At the Harvard College Observatory, the spectra of more than two hundred-thousand stars have been photographed and examined within the last forty years.

The results are at first sight, rather perplexing for the theories of stellar evolution. By the naked eye, we can distinguish between four classes of stars–bluish white, white, yellow and red. These four classes represent four different stages of evolution, the bluish-whilte stars being the hottest (temperature > 15000^0C.) the red stars being the coldest (temperature > 5000^0C.). It was believed by most astronomeers that the nebulae, by a process of gradual condensation, evolved into white stars. These, cooling with age, passed through the yellow red and deep red stages. finally to darkness and extinction e.g., the moon which represents the lowest rung of the process.

But the spectra were rather perplexing. The whitest stars showed only lines of the lightest of elements, hydrogen and helium. These gradually grow fainter, and are replaced by a number of metallic lines, which are produced in the laboratory under a great stimulus. At the lowest stages even these tend to disappear, anda set of line,produced in the laboratory under a low stimulus, come out.

But how are the spectra to be explained? We can detect sodium in the earth, in the sun, in a still hotter star, but not in the white stars. If the stars are composed of the same material, the ninety-two elements which are present in the earth ought to be present in the sun, and in the stars. But as a matter of fact, we obtain only hydrogen and helium in the stars which are in the first stage of evolution. Where are the other elements?

The answer was attempted by Lockyer in his famous "Inorganic Evolution". It was like Icarus's fight, unsuccessful in its ultimate aim, but bringing to light a copious harvest of facts which served as the basis of further work. Lockyer pictured to himself that all elements are products of evolution of simpler constituents, of which hydrogen and helium, and one hypothetical nebulium are probably the chief. The elements are a sort of compound of these primordial elements. Metallic elements disappear in the higher stars, becaus under the high temperature prevailing there, they are broken up into simpler constituents, or into a proto form. With the aging of the star in course of time, elements known in the earth are formed, or evolved. The whole scientific world was then under the spell of Darwin's idea of evolution, and people smelt evolution everywhere.

But Lockyer failed to support his views by experimental proof. Thousands were the experiments which he performed for breaking up the atom and getting hydrogen or helium out of them, but not one was sucessful. Moreover in those days, the physicists' vision was limited by the idea of the inviolability of the atom and Lockyer's views were regarde in orthodox scientific quarters as a sort of scientific heresy. But this idea of the indivisibility of the atom has now followed many other scientific dogmas into oblivion. In 1897, Thompson split up the atom, and discover a more minute constituent, the electron, the atom of negative electricity, whose weight is two thousand times less than that of the hydrogen atom, Recently Rutherford has shown that the atom is a very complicated compund of the two prime elements the electron, and the proton. The protonis the atom of positive electricity, the amount of electricity on it being the same as the amount on the electron, but is has the same weight as the atom of hydrogen. Hydrogen is the simplest compound we have of these two primordial elements. The other elements are somewhat complicated compounds. In all elements, the positive electricity is concentrated at the centre, the electrons rotate round it in paths of various shapes. When these paths are disturbel, light is produced. Under some circumstances, the outer electron may get detached from the atom, as for example when the atom is hit by a rapidly moving electron or a light pure, or by another atom, In the atom, now, the positive charge exceeds the negative charge by one unit, in technical language it is said to be "ionisied". The process is konwn as "ionisaton". The properties of these ionised atoms are entirely distinct from those of the ordinary atom.

The electrical theory of matter has ushered a new era into the history of science, and already innumerable application, have been made of it. "In astrophysics, the application which bids fair to open up a field of very great impotance was first made a year or so ago, by Dr Meghnad Saha, an East Indian, who is a professor in the University of Calcutta." *(Publication of the Astronomical Society of the Pacific, December, 1920, p. 280).*

Thus says Dr. H. N. Russell, professor of Astronmy in the Princ eton University, New Jersey, U.S.A., who was awarded the gold medal of the Royal Astronomical Society of Great Britain for his contribution to the theory of Stellar Evolution in 1919. Professor Russell, like many other astronomers, pondered for many. years why certain types of stars are seemingly composed of only a few select elements? Why in the sun only 45 elements are found instead of the 92 elements known on the earth?

The answer given by Saha is as follows :–In the sun and the stars physical conditions are entirely determined by the emperature. So we have to trace out what happens to matter, if it is treated from the lowest temperatures to, say. 20000^{0}C. The effect of an increasing high temerature is increased division. Solids become liquid, liquids become vapours. The vapours which consist of the gaseous molecules may be either simple or compound. In case they are compound, further heating will decompose them into elementary gases, which consists of discreet atmos. There the physicist of the old school came to a halt. But what happens next?

In the next stage, atoms begin to be decomposed into their elements, electrons and protons. The step in not sudden, but gradual. At first, the atom begins to swell, which becomes manifest from the fact that the atom, which was dark before, now becomes luminous. At various stages of swelling, different sets of spectral lines are emitted. A further heating results in the loss of one of the outermost elctrons. The atom is then said to be ionised. Further heating results in the swelling of the lonised atom, which is indicated by the emission of another set of spectral lines which are found in very hot stars.

All these steps were not only mapped out, hut calculated in approximate terms by Saha. The great German physical chemist, Nernst, who won the Nobel Prize in Chemistry in 1921, has given us a formula by means of which the decomposition of a compound into elements can be calculated from other physical data. Saha showed that with certain additions and alterations the same equation gives us a formula for calculating the ionisation and radiaton of gases. In other words, he treats light emission and ionisation as chemical processes,— as part of a general electronic chemistry. In the words of Dr. Milne of the cambridge Astrophysical Observatory,

"In spite of the complexity of detail offered by the ground coveted, Dr. Saha's papers offer an example of the combination of physical chemistry, the quantum theory, and of theories of atomic structure which can not fail to appeal to one's sense of the beauty of the systematic coordination of physical phenomena." *(Observatory, September, 1920).*

In the calcultion of the process of ionisation, the first thing to be known is the amount of force (or rather work) which is required to tear off the electrons from the atomic system. Tis is different in different atoms. As a rule, in the atoms which are chemically very active, electronos are very easily tonr off. In the atoms which are inert, the electron is bound to the atom with great force. Two atoms of hydrogen, when they combine with each other, yield a molecule, and about 80000 calories of heat are evolved in the formation of 6×10^{25} of such molecules. Similarly there is a heat of ionisation evolved, when the electron combines with the ionised atom. This heat of ionisation need not be direclty determined, but can be obtained from electrical experiemnts. It gives a direct measure of the force with which the electron is bound to the atom.

How these ideas have helped to clear the problems of the sun will be clear fron the following quotatoins from Dr. Russell's paper.

"Take now an element easy to ionize, like sodium. On the Sun's surface at 6000^0, calculation shows that the internal disturbance of the atoms wil be so great that most of them will be ionized. In the spots the proportion will be smaller. Now the neutral sodium atom alone can give the familiar spectral lines of sodium—the ionized atoms giving lines in the far ultraviolet. However, in the spots, where the proportion of sodium attoms wich are not ionozed must be greater, the sodium line should be stronger, and so they are, all of them.

"Potassium, which is easier to ionize, sows the same effect to a more market extent. The rare alkali metal rubidium is still easier to ionize. Its lines do not appear in the solar spectrum at all. This suggests that in the solar atmosphere it is completely ionized, leaving practically no atoms in a condition to absorb the lines that we are looking for, but that in the spots there may be enough of the neutral atoms to produce the lines. *This was predicted by Saha,* and when I went to Mount Wilson I looked the lines up on some beautiful photographs which had been made by Mr. Brackett—and found the lines in the spot specturum just as had been predicted, thereby adding a new element to the rest of those known to be present in the Sun."

"The same principles are of great value in interpreting the spectra of the stars. For example,the whitest stars,like those in Orion show the lines of hydrozen, helium, oxygen and nitrogen, but very few metallic lines. Should we therefore conclude that these blanks are composed mainly of the permanent gases, with very small quantities of the metals, and that their composition differs radically from that of the Sun, where the metalic lines are strong and those of the gases (except hydrogen) are faint or absent? By no means, for there is abandant evidence that the white stars, even at the surface, are much hotter than the Sun. At such high temperatures the metallic vapours must be completely Ionized, so that there are no neutral atoms left to absorb the arc lines, while most of their atoms have lost electrons, and are no longer in a position to give even the enhanced lines The permanent gases, however, are much harder to ionize, and their atoms are therefore in the singly ionized or neutral states, so that they may be recognized in the specturm—oxygen and nitrogen by their enhanced lines, and helium, which has the highest known ionization potential by the lines of the neutral atoms. At the relatively low temperature of the Sun, the excitation is not great enough to stimulate absorptioin of the subordinate series of helium (which alone lie in the visible spectrum) and is barely sufficent to do so for oxygen; while hydrogen, which is easier to ionize, gives srong lines. Such considerations not only explain these apparent difficulties, they open up a news why of *detrmining the surface-temperatures of the stars, which Saha has already used effectively." (Publications of the Astronomical Society of the Pacific, Dec, 1920.)*

A word or two of explanation is probably necessary. Most of thereaders have probably heard of sun-spots. They are round black spots which burst forth from time to time in the body of the sun. It is supposed that they are a sort of vortical diturbance in the sun, attended with a great lowering of temperature, say to 4000^0 from 6000^{0}C. Dr. Saha calculates from his equationis that Rabidium and Caesium, on account of their small heat of ionisatoin, are completely broken up in the sun, but in the spot, the broken parts will reunite, and rabidium will occur in the neutral form. This prediction was verified by Dr. Russell.

In the solar body sometimes briliant white patches, kinown as faculae, are seen. They are the opposite of spots, namely, regions having a higher temperature than the average body of the sun. Saha predicted that these regions would show increased ionisation. This prediction has been verified by Prof. Ch. St. John of the California University.

"Saha has adopted the Nernst equation for the equilibrium of gaseous reaction to the determination of the percentage of ionized to unionizsed atoms as a function of temperature and prerssure. The Saha equation suggests, as he points out, that in the specturm of faculae, owing to their higher temperature, the percentage of ionization should be intended and the enhanced. Strengthened. Preliminary spectrograms of faculae show changes in the interspace of enhaned lines in agreement with this destination in direction of higher temperature." *(Physical Review April, 1922).*

The Saha-theory signifies much more thant mere detection of missing elements or accounting for their absorbment of the stellar worlds. Applied to the stars, it has explained their spectra very satisfactorily and has again set the evolution theory on tits legs. It has done much more than that. Light is the only messenger between ourselves and the worlds in Space. The spectral lines tell much more than merely indicating the presence of a certain element in the stars. They give us information about the details of phisical conditions in these worlds.

The stars may not exert any influence on us, but even the most confirmed utilitarian cannot deny that the sun is the supreme arbiter of the physical conditions in the earth. Even in that early dawn of intellectual life, the Vedic sage worshipped the sun God in the famous hymn, the Gayatri—"Hail to thee, thou great progenitor of the world, thou who quickenest our intelect."

In modern times, the Vedic sage's enusiasm for the cult of Sun-worship has been succeeded by the knowledge that the Sun is not only the source of all energey and life, but it controls wheather and climate—a knowledge of which in advance would be a great boon to mankind. It is now clealry established that when the sun is very active, the magnetic instruments on the earth are disturbed, and there is a great display of 'auroral' light round the poles. Possibly the temperature of the earth as a whole undergoes a change. So a theory which throws light on the physical conditions in the sun cannot but be of of great service to mankind.

In America, through the liberality of the late Mr. Carnegie, an observer has been built on the Mount Wilson at a height of 7000 ft. above the sea level, for studying the sun and the stars. This observatory cannot the biggest telescope in the earth (100 inch diameter) and probably the best collection of instruments in the world. A devoted band of workers, probably the brainiest in America, is here continuously at work. The Director, Prof. Geroge Emery Hale, famous in the scientific world for his discovery of magnetic field in sunspots, and who was entrusted during the war with the organisation of America's scientific resources, thus says of the young Indian's contribution to solar physics. The references here allude to Saha's theory of Selective Radiation Pressure, which is distinct from but allied to the ionisation theory.

"Turning to other aspects of the year's work, we may first mentioin those which bear directly upon this closer alliance with phyisics and chemistry. For many years certain peculiarities of sola and stellar spectra have baffed all attempts at solution. As an example, it has been impossible to understand why the H and K lines, which certainly belong to calcium, an element of comparatively high atomic weight, nevertheless extend to the highest levels in the solar atmosphere, far outreaching thelines of sodium, magnesium, and other lighter elements. Dr. Megh Nad Saha, Assistant Professor of Physics in the University of Calcutta, has recently offered an explanation which appears to be generally applicable to the interpretation of many of the most puzzling phenomena of solar and stellar spectra. According to this view, the H and K lines are the enhanced lines of a calcium atom which has lost one electron, whereas the fundamental line of neutral calcium is 4227. In the higher levels of the chromosphere, where the ionized atoms, remain as conspicuous lines. The D-lines of sodium and the b-lines of magnesiumare due to the neutral atoms, which are not present at high levels, and the lines corresponding to the ionized atoms of these and other elements fail to appear because they lie in the extreme ultra-violet, with the possible exception of 4481 of magnesium. Space is lacking to give further details, *but Saha has alrady pointed out many possible applications of his theory, and others will rapdily develop.* In evidence of this, attention is called to the important results obtained by Dr. Henry Norris Russles, Research Associate of the Observatory, who has extended the theory to the case where atoms of several kinds are present, and tested it in a preliminary study of the spectra of sun-spots. Among the interesting results of this work is the discovery in the Bun of rubidium, shown by the presence in the spot spectrum of two lines in the infra-red, as predicted by Saha. *A general attack on solar, stellar, and laboratory spectra from this point of view, in which Dr. Russell and other members of the staff will take part, is being organized.* In this connection it is expected that the determination of certain ionizing potentials and the study of many other fundamental aspects of the question will be undertaken at the California Institute." *(Astronimical Society of the Pacific, December, 1921, page 298.)*

In the Paris museum of arts, there is a medal illustrating in a beautiful manner the invigorating influence of one science upon another, A lady is sinking with torpor and exhaustion. Another lady comes up and plants a torch in her hand. In the next scene, the lady who was sinking stands up with a new life and fresh vigour.

In the history of the sciences, we often come across dull epochs—when it seems that there is nothing else to be done except in extending the works initiated by former masters; in the pursuit of a particular branch of science, the investigator no longer experiences that pleasing sensation of thrill and expecancy and scientific work is reduced to the level of mere dry, routine business. Oftentimes during such dull periods unexpected light is thrown from a cognate science which instils a new life into it.

Probably no other science furnishes better examples of this type than Astronomy. It has often been called the mother of sciences, for it dates from the very dawn of intellectual life in this earth of ours. Mathematical and physical sciences largely grew up as handmaids to astronomy. But repeatedly in course of its progress it has sunk to the level of a dry routine subject, but it has as often been rescued from that position by borrowing new light from sciences that sprang from it, from mathematics and physics.

In the foregoing pages, we have related how atomic physics came to the aid of astronomy, and it is a matter of gratification to us that this happy union was effected through the intermediary of an India.

"It is a significant pionering work in a virgin soil........ and is to be greeted as a very important steop in the working together of physics and astrophysics."........so says Prof. W. Westphal of the Berlin University in presenting a report of thework to the Berlin physical colliquim *[Naturwissenschaft, October 1924]*.

One distinguishihg feature of Dr. Saha's work is that it not only closes a period of controversy and doubt, but opens up a new field of research work. Already important applications of the ionisation theory have been made by Prof. H. N. Russell and Prof. A. S. King, and more is coming forth in course of time. Prof. Russell says at the conclusion of one of his papers :—

"The principles of the ionization theory will evidently be of great importance throughout the whole field of astrophysics. And Dr. Saha had made an application of the highest interest to the question of the physysical meaning of stellar spectra. The possibilities of the new methods appear to be very great to ulitize it fully; years of work will be required to study the behaviour of the elements mentioned above and of others, in the stars, in laboratory spectra and by the direct measure men of ionization, but the prospect of increase of our knowledge, both of atoms and of stars as a result of such researches, makes it urgently, desireable that they should be carried out. " *(The Astrophysical taurnal, March, 1922.)*

Scientific work may be likened, in some respects,to prospecting for gold. Sometimes the gold hunters may be labouring through miles of quartz-veins without coming across a single pennyweight of gold. At other times,after two or three strokes, he may come across solid nuggets of gold; My young friend,in his search for truth and knowledge, has come across what promises to be a bed of solid nuggets.

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*The Modern Review Dec, 1922, pp.718-724.

The Indian School of Chemistry

To realise fully the enormous amount of original scientific research work done by Dr. Ray and his many distinguished pupils, one has only to glance at the list of their contributions and the account of the Bengal Chemical and Pharmacential works given :

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Ray's Essay's of Discourses–pp. 302-314.

CHEMICAL RESEARCH AT THE PRESIDENCY COLLEGE

(July, 1895–May, 1897)

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I.	Mercurous Nitrite.	1–11
II.	The Nitrires of Mercury and the Varying Conditions Under Which They are Formed	Vide Journal, Chemical Society, 1897, Trans. 337-350
III.	Mercury Hyponitrietes.	
IV.	On the Interaction of Mercurous Nitrite and The Alkyl Iodides.	Proc. Chem.Soc. Nov. 19, 1896
V.	On the Constitution of Mercuric Hyponitrite, Nitrite and Nitrate.	12-16
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On Mercurous Nitiite.*

(Read December, 1985)

Preliminary

Having recently had occasion to prepare mercurous nitrate in quantity by the action of dilute nitric acid in the cold on mercury, I was rather struck by the appearance of a yellow crystalline deposit. At first sight it was taken to be a basic salt, but the formation of such a salt in a strongly acid solutin was countrary to ordinary experience. A preliminary test proved it, however, to be at once a mercurous salt as well as a *nitrite*. The interesting compound promised thus amply to repay an investigation.

Historical.

Lefort, Gerhardt and Marignac, especially the last, have studied and described in detail the action of nitric acid on mercury under varying circumstances. We have to labour here under the serious disadvantage of not having access to the original memoirs of these French chemists. Fortunated a complete resume of marigmae's work is to be found in Fremy's *Encyclopedie Chimique*. The information as regards mercurous nitrite, however, is scarcely worth anything.[1] Roscoe and Schorlemmer in their well-known teatise do not so much as mention this compound, nor is there any reference to it to be found in the latest edition of Watt's *Dictionary of Chemistry*.

Method of Preparation.

Yellow nitric acid, sp. gr. 1.410, is diluted with water in the proportion of 1 to 3 in a flask or beaker. A large excess of mercury is at once poured into the liquid. The heat of solution of the acid in water helps to start the reaction. A gentle effervescence of gases at once takes place, and in the course of about an hour yellow needles resembling prismatic sulphur, begin to appear on the surface of mercury, After a few hours the liquid together with the mercury is carefully decanted off, and the salt shaken out of the vessel over porous tiles to remove the adhering mother-liquor.

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* Reprinted from the Journal, Asiatic Society of Bengal. Vol. LXV, Part II. No.1, 1896. See also Zeit, Anorg. Chem. Bd. xii. 1896.

For purposes of analysis, *etc.,* it is preferable to collect the first day's or a most the second day's crops only, partly because minute globules of mercury get entangled among the mass of the crystalline deposit, which it is tedious to get rid of and partly because the composition of the salt varies on standing in the liquid. Thus it is found that if the salt, instead of being removed, is allowed to remainin contact with the mercury and the mother-liquor, it gradually disappears and in its place transparent, peffectly colourless, crystals are formed, which grow in size with time. These latter will be described under the name of "Marignac's salt," which is a basic mercurous nitrate.

Qualitative tests.

The new compound among others answers to the following tests:–

1. Dilute sulphuric acid slowly evolves nitrous fums: more readily on heating.

1. On warming with a large excess of water, globules of mercury seperated out. In the cold the decomposition is only partial.

The perfectly clear mother liquour decanted off mercury; gives the following reaction.

(a) Boiled with an excess of pure caustic soda solution it yields a black dense precipitate the nitrate from which after acidifications with dilute sulphuric acid, rapidly decomposes pottasium permanganet solution and instantly sets 'free' iodine from pottasium iodide.

(b) Sodium chloride throws down a copious white precipitate; after removal of the ....the nitrate is now devided with several portions; to one is added coustic soda; and a yellow precipitate is the result, another portion treated with pottasium iodide gives an orange precipitate; whilist a third portions addition of hydrochloric and phosphorus acid yields a further quantity of mercurious chloride.

It is thus evident that in the clear solution we have both a mercurous and a metallic salt as well as nitrite. Urea does not give the faintest qualescense to the liquid, showing the absence of mercuric nitrite.

Quantitative Analysis to Estimate of Mercury

In determining the composition of the salt the amount of mercury in it will have the predominating voice; on account of the high atomic weight the nitrogen playing only a minor part. The estimation of this metal will therefore be restricted somewhat in detail;

It has already been shewn that when the salt is heated with a large bulk of water metallic mercury separates out, leaving in solution both an...salt and...salt the mercury this isolated sometimes. Collect steadily into a single globule; sometimes it remains a grey powder, the whole of which is difficult to agreegate into globules, even after continued heating with hydrochloric acid. For estimation, the mercury is not transferred to a rated crucible and kept under a dessicator. The merury weight in the form will be a dessicator. The mercury weighed in this form will be termed 'free' mercury all along.

The solution decanted after mercury with the thrasings of the vessel is considerably diluted with water and an excess of hydrochloric and phosphorous acids added to it. The mixture is now allowed to stand overnight and the precipitate of mercurous chloride weighed in the usual way. When, however, it is desired to estimate the *ous* and the *ic* salts separately, treatment with sodium chloride is resorted to previous to the addition of hydrochloric and phosphorous acids, and the calomel then weighed in two instalments. Although this method yields accurate results, it often proves a very tedious one. After removal of the calomel by HCl + H_3PO_3, and further dilution of the filtrate with water, a small quantity of precipitate, varying from a few centi- to milligrams is generally obtained the succeeding day, and so on. Probably it was the nitrous acid necessarily present in the liquid which caused this kind of retardation in the precipitation of calomel.[2]

In a few cases the mercury in the *ic* salt was estimated as the *sulphide*. But this method is almost equally troublesome on account of the large quantity of sulphur set free. The pores of the filter-paper get chocked up, and the filtraton, though carried on under reduced pressure with the aid of Bunsen's pump, proceeds very slowly. Moreover the precipitate has to be digested with a strong solution of sodium sulphite, thoroughly washed with hot water, dried and re-washed with carbondbisulphide, purified by being kept over mercury and re-distilled. Unless the precipitate is treated once more with carbon bisulphide, the result is apt to be too high. There is thus not much to choose between these methods. Both, however, give satisfactory results when conducted with care and patience.

Preparation I.–0.8695 gram. substance gave 0.274 gram. "free" mercury = 31.5 per cent. "free" mercury. 1.1895 gram. substance kept over H_2SO_4 in the dessicator; July 27th 1895. July 30th, wt. = 1.184 gram; after a month's stay in the dessicator, the wt. was constant = 1.184 gram. 1.184 gram. substance gave 0.3485 gram. "free" H., =29.43 per cent. "free" Hg.; 0.246 gram. Hg_2Cl_2 from the *ic.* salt = 30.27 per cent. Hg.

Preparation II.–1.2865 gram. substance gave 0.3957 gram. "free" Hg.,=30.76 per cent.: 0.25 gram. Hg_2Cl_2 from the *ous* salt = 16.5 per cent Hg.; and 0.4645 gram. Hg_2Cl_2 from the *ic* salt = 30.69 per cent. Hg. 1.224 gram. substance gave 0.3575 gram. "free" Hg., = 29.2 per cent.; 0.243 gram. Hg_2Cl_2 from the *ous* portion = 16.86 per cent. Hg.; and 0.437 gram. Hg_2Cl_2 from the *ic.* portion = 30.31 per cent. Hg.

Preparation III.–1.641 gam. substance gave 0.5025 gram. "free" Hg.,=30.62 per cent; 0.348 gram. Hg_2Cl_2 from the *ous* salt = 17.8 per cent. Hg. and 0.5965 gram. HgS from the *ic* salt = 31.33 per cent. Hg.

The results are presented here in a tabulated form for convenience of reference.

	"Free" Mercury	Mercury in the *ic* Salt.	Mercury in the *ous* Salt.	Total per cent of Mercury.	
1.	31.5	...	...	...	
2.	[29.43]	30.27	17.7	78.67	mean 78.45
3.	30.76	30.69	16.5	77.87	
4.	29.2	30.31	16.68	77.87	
5.	30.62	31.33	17.8	79.75	

The percentage of "free mercury" in analysis (2) and (4) respectively comes out too low. The cause of this has been already explained. Whenever the mercury separates out as fine grey powder it is difficult to collect the whole of it into globules; during the decantation of the liquid a part of it is carried off, and during the process of boiling with hydrochloric acid to induce coagulation, another portion is lost by volatilisation. As Fresenius himself remarks: "in general a little mercury is lost." In analysis (5) the percentage of mercury in the *ic.* salt is a little too high, because this was estimated as HgS (see *ante* p.4). It would be safe to take 30.7 as the percentage of mercury both in the "free" state as well as in the *ic.* salt, and this number has been actuallly taken in calculating the percentage in (2) and (4).

B. Estimation of Nitrogen.

The salt was boiled with water and after separation of "free" mercury, the clear liquid was made up to a definite volume and generally 4 c.c of it treated in the nitrometer. In the case of very dilute soluions of alkaline nitrites and nitrates it is generally the custom to take a larger volume of the liquid, evaporate it to dryness and then dissolve the residue in the minimum quantity say 2 c.c.) of water. But unfortunately this could not be done in the present case, as thereby insoluble basic salts were formed. In dealing with small quantities and experimental errors would no doubt be highly magnified and thus tend to vitiate the result; but the method is one which admits of rigorous exactitude, as was proved by blank experiments with dilute solutions of potassium nitrate.[3]

Preparation IV *(a)* Substance = 0.2554 gram.; Volume of solution = 65 c.c.

4 c.c. Sol. = 1.5 c.c. No; t = 33^0C; P=760 mean (mean of 4 concordant estimations). whence No = 11.45 per cent.

(b) Substance = 2.008 gram; Vol. of Sol. = 226 c.c.

4 c.c. Sol = 3.5 c.c. NO (mean of 3 estimations); t = 31^0C; P=760 m.m Whence NO = 11.87 per cent.

(c) Substance = 2.299 gram; Vol. of Sol. = 234 c.c.

4 c.c. Sol. = 3.9 c.c. NO (Mean of 4 estimations); t = 32^0C; p= 760 m.m. Whence NO = 11.93 per cent.

Evidence as to the salt being a nitrite pure and simple.

As the Crum-Frankland method does not enable us to discriminate between the *nitrate* and *nitrite,* use was made of the well known reaction between urea and nitrous acid.[4]

It was found that the polution of the *ous* and *ic* salt was only slowly and imperfectly acted upon by dilute sulphuric acid it was therefore treated with pure caustic soda and warmed. In this way the nitrite was converted into an alkaline salt.

Substance–0.7285 gram;. Vol. oc Sol. = 100 c.c.

After absorption of CO_2 by strong lye;

4	c.c. sol	=	2.85	c.c. N	{	t = 32^0C.
5	do	=	3.55	do		
10	do	=	7.10	do		P = 756 m.m.

Wence NO=11.7 per cent.

As the urea also gives up the whole of its nitrogen according to the equation given below, the experimental error is thus diminished by half.

$2\ HNO_2 + CON_2H_4 = CO_2 + 2N_2 + 3H_2O.$

Dunstand and Dymond's method of estimating nitrites was also applied; but in this case it is extremely difficult to prevent leakage of traces of air. The Result in general was rather high.

The mean of the several estimations of nitric oxide is 11.74.

Discussion of the Results and Theoretical Considerations.

The result accord well with the formula :

$HgNO_2+1/2\ H_2O$[6]

			Theory.	Found.
Hg	=	200.00	78.43	78.55
$\{$ NO	=	30.00	11.77	11.74
O	=	16.00	6.27	
$1/2H_2O$	=	9.00	3.53	
		255.00	100.00	

On dilution with a sufficiently large quantity of water, the salt moreover undergoes dissociaton; thus :

$$Hg_2(NO_2)_2 = Hg + Hg(NO_2)_2$$

The amount of mercury set free being equal to that contained in the *ic.* salt, quantitative proof of which has been given above. The dissociation of mercurous nitrite is analogous to that of calomel[7]

$$Hg_2Cl_2 = Hg+HgCl_2$$

Diminution of pressure in one case playing the role of dilution in the other; nearly 22 per cent. of the salt, however dissolves *as such,* and dilution has no further effect in increasing the proportion of dissociation *(Vide* table, p. 4)

The present compound throws additional light on the action of nitric acid on the copper-mercury group of metals. It is now admitted by chemists that "in their relation to nitric acid metals must be divided into two classes" To the former belong those which produce ammonia and hydroxylamine from it; *e.g.*, Tin, Zinc, Cadmium, Iron Aluminium, Potassium, &c., while the latter includes Copper, Silver, Mercury and Bismuth. These seem to enter into direct union with the nitrogen of the acid, instead of displacing its hydrogen. The formation of the *nitro* compounds of the fatty series by V. Meyer's method lends additional support to this theory. This *nitronic* constitution of nitrous acid, as Divers puts it, also explains the advantage of red or yellow nitric acid in dissolving metals of the silver-mercury class.[7]

$$\begin{array}{l|l|l}\mathrm{Ag} & & \\ & NO_2 + HO & NO_2 = \begin{array}{c}AgNO_2\\AgNO_2\end{array} + HOH. \\ \mathrm{Ag} & & \end{array}$$

Indeed, the presence of nitrous acid seems to be *sine qua non* for the dissolution of metals like silver, mercury, &c., as ws first pointed out by russell.[8] This chemist also showed that when silver dissolves in nitric acid, "silver *nitrite* is formed in quantity, partly in solution in the silver nitrie liqour, as crystals." The stability of silver nitrite in presence of strong nitric acid is noteworthy, as ordinary nitries are decomposed even by the weakest acids. The nitronic nature of silver nitrite affords a ready explanation of this apparent anomaly.

Acworth and Armstrong in their classical researches found "that the amount of gas [NO] obtained by decomposing silver nitrite by "nitric acid varies according to the strength of the acid, *being greater"the weaker the acid"* (the italics are ours).....again "no amount of heating will effect this [decompositon] if the acid be concentrated."[9] Mercurous nitrite seems to behave exactly like silver nitrite.

The traces of nitrous acid, present in the yellow nitric acid, no doubt, start the reaction, but how to account for the continued formation of mercurous nitrite? For, this small quantity is soon used up according to the equation given above. There must be a parallel reaction going on to keep up the supply of nitrous acid. Acworth and Armstrong thus explain the action of copper on nitric acid.[10]

$$\begin{array}{lcl} Cu + 2HNO_3 & = & 2H + Cu(NO_3)_2 \\ 2H + HNO_3 & = & HNO_2 + OH_2 \\ 3HNO_2 & = & 2NO + HNO_3 + OH_2 \end{array}$$

Adopting this view, the mercurous *nitrite* would continue to be formed for some time, and being insoluble in the meanstrum, would be precipitated; whils mercurous nitrate would remain in solution. The strength of the acid also would go on deminishing, till a time arrives when mercurous nitrite is no longer stable in this liquid, the nitrous acid decomposing according to the equation :

$$3\,HNO_2 = 2\,NO + HNO_3 + OH_2$$

and Marginac's salt begings to be formed. The transformation of the nitrite into nitrate is however very slow, the process extending over weeks.

During the initial stages of the reaction the reveerse change seem to take place; for, on the surface of the mercury somewhat brisk effervescence goes on, but proportionally very little nitric oxide escapes. During its upward ascent most part of it is absorbed, thus:–

$$2\ NO + HNO_3 + H_2O = 3\ HNO_2$$

A strong proof in favour of this view seems to be the fact that as soon as the superincumbent liquid is poured off, torrents of red fumes appear on the surface of mercury.[11]

The place of mercury in the periodic System would naturally justify the expectation that it would yield the *analogue* of silver nitrite and the present compound is a realisation of it.

Although the compounds of monatomic mercury resemble the corresponding ones of silver, there is a sharp distinction between them Silver never gives basic or hydrated salts, whilst the compounds of mercury with nitric or nirous acids seem to be almost invariably basic or hydrated or both.

It has already been said that for purpose of analysis the first or second day's crop should be collected; after a longer time a granular mass of yellow rhombic tabular prisms (?) is obtained, which is rather richer in the percentage of mercury and at the same time much less stable. When this salt, after being dried on the porous tile, is kept in the bottle, it constantly evolves nitrous fumes.

Temperature also seems to have an important bearing on the formation of the present salt. The ordinary temperature of the Laboratory in sumer season, 31^0 to 30^0C., seems to be very favourable for the growth of the needles.

The different mercurous nitrities and nitrates and mercuric nitrite as also an attempt to prepare nito-ethane with the aid of the compound now describhed, will form the subject of subsequent communications.

Notes :

1. The words which have a direct bearing on the present subject are quoted here: "L'azotite mercureux se forme...en meme temps que l'azotate mercurique d'apres Lefort, cheque rols queL'on alaque due mercure per de t'acide nitrique. D'antre part, Gerhardt n'admet pas l'existence de l'azotite mercureux et il considere les produtis obtenus comme do l'azotate mercurose-mercurique.' Tome III. p. 240.

2. In the estimation of mercurous nitrate no such retardation occurs.
3. One who has made the estimation of nitrites and nitrates almost his lifelong study testifies as regards the Crum-Frankland process, "that in the absence of organic matter and with proper manipulation in the shaking tube, the method is one of great accuracy and capable of determining extremely small quantities of nitrates or nitrities." Warington–Chem. Soc. Jour, 1879, page 387.
4. For details of this process see "A gasometric method of determining nitrous acid," by P. F. Frankland Chem. Soc.Jour LIII, 364.
5. While correcting the proofs I may as well mention here that the salt has the formula $Hg_2(NO_2)_2$. Since the memoir was presented to the Soceity. I have made repeated analyses of it, the mercury being estimated as sulphide, as phosphorous acid given very low results in presence of nitrous acid. The percentage of "free" mercury has been found to tie 31.41, that in the *ic* salt, 31.41 and that in the ous salt, 017.8; total 80.62. Theory for $Hg_2(NO_2)_2$ requires 81.3.
6. Harris and V/ Meyer's recent experiments fully bear out the conclusion arrived at by Odling years ago. See "Ueber den Molekularzustand des Kalomel dampfes" Berichte : 27 (1894) p. 1482.
7. Divers: Chem. Soc. Journ, for 1883 Trans., p. 443; also *ibid.* Trans. for 1885, p. 231.
8. "On the action of Hydrogen on Silver Nitrate," Chem. Soc. Journ Tans.
9. On the Reduction of Nitric Acid, &c., Chem Soc. Journ, Vol. LI. (1877) p. 54 *et seq.*
10. Whether NO is formed through the agency of *nascent* hydrogen, or by the *direct* action of the metal or nitric acid must be left at present an open question. Cr. Deville; De L'etal naissant, compt. Rend;, 1870, LXX., 22,550.
11. Veley also arrives at this conclusion. "If the conditions are such that "these metals [Copper, Mercury and Bismuth] dissolve, it would appear that the "metallic nitrite is at first formed, together with nitric oxide. The former is decomposed by the excess of nitric acid to liberate nitrous acid, whilst the latter reduces the nitric acid to form a further quantity of nitrous acid."

   "Eventually the net result is the product of two reverse chemical changes represented by the equations–

   (1) $2\ NO + HNO_2 + H_2O = 3\ HNO_2$

   (2) $3\ HNO_2 = NO + HNO_3 + H_2O$.

   Proc. Royal. Soc. (1890), 48, p.458.

On
The Constitution of Mercuric Hyponitrite, Nitrite and Nitrate.

I–*Mercuric Hyponitrites.* II–*Trimercuric Sulphate and its new Modifications.* III–*Theoretical Considerations.*

Preliminary

Evidence has already been adduced in favour of the *nitronic* constitution of mercurous nitrite.[1] It has also been found that though it is not possible to prepare mercuric nitrite in the solid state, a neutral solution of it is however easily obtained as product of the dissociation of mercurous nitrite. Such a solution on treatment with a dilute solutioni of sodium hyponitrite as prepared by Zorn and Dustan and Dymock's method, which necessarily contains *Potassium sulphate,* was found to yield mercuric hyponitrite.[2] It was thought desirable to study the actoin of this reagent on mercuric nitrate as well with a view to gain an insight into its constitution. The investigation has led to results which seem to be of interest.

I

(a)

Mercuric Hyponitries

A concentrated solution of mercuric nitrate is first got ready containing the minimum amount of free nitric acid essential to its very existence in a state of solution. This object is gained as follows:– The stock solution of the nitrate more or less acid is carefully diluted with water, till a flocculent white precipitate of basic nitrate just begins to separate out, and which remains suspended in shreds. The liquid is heated to boiling so as to coagulate the basic salt, which is removed by filtration. To the filtrate is now cautiously added a solution of sodium hyponitrite prepared as above, when a light gelationous white precipitate appears at the top of the liquid, which takes a long time to settle down. Great care should be taken at this state, for if too much of the precipitant be added all at once, a yellow powdery deposit begins to appear. It is necessary to work with a very large bulk of the nitrate solution in order to get this gelatinous substance in quantity sufficient for analysis. It shrinks to a very small amount when it is dried over sulphuric acid. In its general propertries the substance resembles the hyponitrite previously described.

Analysis.

The compound has the formula $Hg. (NO.)_2 + 3 Hg O+5H_2O$.

Calc.	Found	
	I	II
Hg.....80.17	80.15	80.47
N......2.81	2.98	—

The presence of water was proved qualitatively by gently heating in a bulb tube. The substance is apt to be contaminated more or less with the basic mercuric sulphate described below.

(b)

A solution of mercuric chloride was treated with sodium hyponitrite solution exactly as above. A gelatinous white precipitate was thus obtained; when dried, it had a yellowish white appearance. In the present instance *it is immaterial whether a concentrated or dilute solution of the chloride is used.* This compound corresponds to the formula $Hg (NO)_2+3H_2O$, in fact it is the same salt as obtained from mercuric *nitrite.*

Calc.	Found
Hg.... 83.16	82.90
N. 2.91	3.13

II

Trimercuric Sulphate and its new Modifications

a

The filtrate from the gelatinous precipitate [See. Prep. I (a)] is diluted *ad lib.* when a yellow impalpable powder comes down almost immediately, the amount of dilution depending upon the strength of the filtrate. From what has been already said it would be evident that when the mercuric nitrate solution is very largely diluted to begin with and the basic nitrate precipitate got rid of as before and then treated with the precipitant, the yellow powder is at once obtained without the gelatinous hyponitrite.

b

It has been pointed out above that in order to obtain the yellow powder the filtrate from the gelatinous substance has to be copiously diluted with water; now, if this filtrate instead of being diluted be allowed to stand overnight. a crystalline form of the yellow compound is obtained, which is sometimes of a bright orange colour and sometimes orange, with a brownish tint. The mother-liquor from this orange variety of the basic sulphate when largely diluted with water yields as before the yellow powder. One should practise on a small scale in order to acquire the necessary experience for obtaining these modifications.

c.

When the dilute filtrate from the yellow powder (a) is bolled in a flask for sometime, it may be for an hour or two, and thus slowly concentrated, crystalline bright yellow scales, and sometimes a scaly powder, is gradually deposited at the bottom.

The yelow powder (a), the formation of which has been described above, is the well-known trimercuric sulphate——mineral Turpeth. This as well as its β and χ modifications will form the subject of the next paper.

III

Theoretical Considerations.

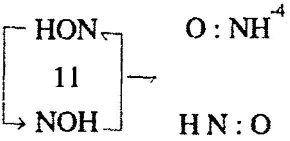
A solution of mercuric nitrites or chloride, *whatever highly diluted it may be,* always yields mercuric hyponitrite, when acted upon by sodium hyponitrite solution in presence of potassium sulphate; but a solution of the nitrate under similar conditions gives tri-mercuric sulphate.

It appears that in mercuric nitrite as in mercurous nitrite, the nitrogen is directly attached to the metal, whereas in the nitrate as is generally accepted, it is united to oxygen. In the former there is no tendency for the NO_2 group to detach itself from the metal, but in the latter on dilution and in presence of the alkaline sulphate the split takes place as indicated by the dotted line :

$Hg—O\vdots—NO_2$. The sodium hyponitrite seems to take no direct part in the reaction unless the mercuric nitrate solution be sufficiently concentrated. In one respect however the alkaline hyponitrite plays a conspicuous part, in that by its solvent action upon the basic mercuric sulphate it retards imediate precipitation and thus favours the formation of its crystalline modifications.

The researches of Professor Divers and of his pupils Haga and Shimidzu have thrown a flood of light on the constitution of silver nitrite and of mercuric sulphites.[2] The "non-oxylic or haloid" character of these salts forms the "central conception in their Chemistry." Mercuric nitrite also has a *haloid* constitution. It is well known–though sufficient recognition of it has not generally been taken in the text-books—that the halogen compounds of mercury are with difficulty accept upon by sulphuric acid. The nitrite of mercury also resists the action of the sulphate. This haloid constitution of the nitrities is the"central conception" in the Chemistry of the compounds which form the subject of the present investigatin.[3]

A few pertinent remarks might be made here as regards the constitution of silver and mercury hyponitrites. Both these salts dissolve *as such* in dilute nitric acid and are reprecipitated on the addition of an alkali. It has also been found that mercuric hyponitrite does not readily dissolve in dilute nitric acid and is with still greater difficulty soluble even in boiling strong nitric acid. On neutralizing the solution with alkalies a voluminous flocculent precipitate of the hyponitrite is thrown down. The behaviour of hydrochloric acid towards mercuric hyponitrite is also interesting. This acid in the dilute state and even in the cold readily dissolves the salt, which is reprecipitated on neutralization with an alkali. Thus, mercuric chloride is not formed in soluton. In other words the affinity of mercury for the radical of hyponitrous acid (whatever its constitution might be) is greater than that for the halogen. All the well-knwon reactions of silver hyponitrite as well as the several methods of formation of the hyponitrites seem to point to a "diazo" constitution of hyponitrous acid–HO–N_2–OH; it is however possible that in certain cases this acid and its sals, especially those of silver and mercury, exist in tautomeric modifications. Thus:–



This imidic constitution would have the metal direcly bound to nitrogen. The comparative stability of the mercury hyponitries in the heat does not also seem to be in accord with their *diaso* strucuture.

It has been shewn above that the concentrated solution of mercuric nirate under favourable conditions when treated with sodium hyponitrite and potassium sulphate gives rise to mercuric hyponitrite in preference to trimercuic sulphate. In other words, mercury exchanges its place in the nitrate which is an oxylic salt, for that of the hyponitrite in which it is directly attached to nitrogen. It is only when the nitrate solution is used in a dilute form that other forces come into the field of action, and a basic sulphate is the result.

In a subsequent communication entitled "the Interaction of the alkaline hyponitrites with the salts of the since-coper group." the author hopes to develop this theory further.

On

Trimercuric Sulphate and its new Modifications

Historical

Trimercuric Sulphate, the salt corresponding to hexabasic sulphuric Acid, Sa $(OH)_6$, has been konwn since the 16th century. "Das basiache schwefetsaure Queck Silberoxyde kanute Schom Basilius Vatentinus... inder Paracelsischem Scbule wnrde dies salz meist mineralischer Turbith order Turpeth gennant" (Kop.: Geschichete IV, 188).

In the present century this compound has been described by several chemists from time to time. Kanfe gives it to the formula investigation would, however, go to show that this is really a hydrated salt having the formula $HgSO_4$–2HgO–1/2H_2O. It is probable that the percentage of water being so low as 0.22 has hitherto escaped notice. In fact the analysis of R. Phillips and of Braamcamp and sig. Ol. conform to the latter formula.[5] The orange and the bright yellow crystalline modifications I do not find described anywhere.

"The method of preperation of the α, β & χ modification of this salt has been described in the previous paper. The α and the β forms are both hydrated and have the same formula, namely that given above; whilist the really anlydrous salt can only be obtained by the method of preparation given under χ.

General Properties

All these compounds dissolve in dilute nitric and hydrochloric acids and more neadily on warning; the solution in the latter acid has a fainlly opadescent appearance, due to the presence of traces of calomel. When dried at 100°. the hydrated varities α and β do not lose water nor change in colour. When heated to a higher temperature. in yellow powder (α) gives up water and assumes orangfe to brown coloration; but it reverts to the original colour on cooling. The orange and the orange-brown granco-crystalline variety (β) loses water under similar conditions and falls to a yellow powder. When heated to about 400^0 these basic sulphates behave in a remarkable way; it is true that they begin to decompose long before this temperature is reached, but at about this temperature they are converted into mercuric sulphate having given up the odide of mercury as metallic mercury and oxygen; the mercuric sulphate then fuses to a brown liquid and volatilies as mercurous sulphate, oxygen and sulphur dioxide being at the same time liberated. The decomposition can be represented by the following equation: $2[HgSO_4\ 2HgO] = Hg_2SO_4+.4Hg+3O_2+SO_2$

Analysis.

Method of analysis : The mercury was estimated as sulphide in the usual way. The water in the yellow variety (α) was determinded by heating in a tube in a current of dry carbonic acid gas. In the cooler parts of the tube near which the calcium chloride tube was attached there was interposed a layer of gold leaf, so as to arrest vappurs of mercury which might otherwise enter into the $CaCl_2$ U-tube. Perhaps, it would not be unnecessary to mention here that the yellow powder was dried at 100^0, then powdered again, so as to break up the small lumps and again transferred to the steam chamber. When the weight of the substance was constant it was kept in a dessicator over sulphuric acid. The possibility of the presence of mechanically held or absorbed water was thus guarded against.

Result of Analysis.

α and β

Calc. for	Found											
$HgSO_4 2HgO\ 1/2H_2O$	1	2	3	4	5	6	7	8	9	10	11	12
Hg . 81.44	80 76	80 73	81 28	81 26	80 72	80 55	81.26	80.67	81 13	80 85	81 13	81 47
SO_4 13.02			13.48									
H_2O 1.22		1 16		1 25								

Theory for the anhydrous salt demands Hg=82.420. It may be added here that the analyses given above are of different preparations, with the exception of 3 and 4 which belong to one and the same preparatio. It will be found that the percentage of mercury generally comes out too low. The reason of this is that in these preparations minute portions of mercuric nitrates and the alkaline sulphate are invariably "carried down" during the precipitation, which cannot be got rid of even by repeated washing. In a few cases the nitrogen, and the alkaline sulphate contained in the fitrate, were determined. Thus in 9 the percentage of potassium sulphate amounted to 0.73 whilst in 10 it rose so high as 1.33. The nitrogen generally came up to 0.25 to 0.75 per cent.

It is well-known that wherever oxide of mercury is prepared by treating mercuric nitrate with caustic alkali, it is never chemically pure, the impurities being mercuric nitrate and alkali.[6] Haack has described the proparaton of mercuric arsenate by double decomposition of mercuric nitrate and sodium arsenate. He found that the compound thus obtained was always contaminated with mercuric nitrate and sodium nitrate. The result of his analyses,[7] which is given below, will explain as to why it is that the mercury has generally come out too low and sulphuric acid too high in the estimations given above.

	Calc. for	Found			
Hgs $(AsO_4)_2$		I	II	III	IV
As_2O_5....	26.50	25.50	24.37	26.10	26.00
HgO ...	73.80	72.23	73.01	73.68	73.00
Na_2O...	–	0.73	0.19	–	–
N_2O_2....	–	1.43	1.85	–	–
	100.00	99.89	99.42	99.78	99.60

This is the really anhydrous salt. When it was heated in a dry bulb tube not a trace of moisture was noticed in the cooler parts.

Analysis.

Cacl. for $HgSO_4$ 2HgO	Found
Hg... 82.42	82.53
SO_4...13.19	13.33

The Action of Heat on Trimercuric Sulphate as decribed above (see page 17) was studied in the following way. The compound was placed in a porcelain boat and heated in a combustion tube, 65 c.c. long, in a current of carbonic acid gas. As the decomposition of the oxide of mercury is a case of dissociation, there is a tendency for the components to re-combine in the cooler parts of the tube. This was prevented by the current of the inert gas which chased away the oxygen into the collecting tube, filled with mercury and strong potash lye, the moment it was set free. (See Devile : Compt. Rend.56, 729). A Hoffmann's furnace was used and the progress of decomposition could be watched from time to time. The behaviour referred to above was noticed in every case of the mass of the substance fusing and swelling up immediately before complete volatilisation. The white sublimate of mercurous sulphate was deposited near the heated portion of the tube and the "mirror" of mercury away from it.

The decompositon was quantitatively established as follows:–

The white sublimate of mercurous sulphate together with the mirror of mercury was treated with dilute nitric acid and shaken up. The contents were the transferred to a beaker; the liquid, holding in solution mercurous sulphate, was decanted off the metallic mercury. The later was warmed with hydrochloric acid to make the small globules coagulate into a single one. The mercurous sulphate solution was warmed with hydrochloric acid to make the small globules coagulate into a single one. The mercurous sulphate solution was treated with sodium chloride and the calomel weighed in the usual way. The sulphuric acid in the filtrate was also estimated. If the salt decompes according to the equation:–

$$2[Hg\ SO_4\ 2HgO\ 1/2\ H_2O] = Hg_2\ SO_4 + 4Hg + 3O_2 + SO_2 + H_2O.$$

we should expect that the "free" mercury would amount to doubhle the quantity obtained from calomel and that the sulphuric acid radical SO_4) as well as oxygen would amount to half of what is contained in the original salt.

Result of Analysis.

	Calc.	Found		
		1	2	3
Hg (metallic) ...	54.28	54.00	55.42	52.92
Hg (in calomel)...	27.14	25.90	25.80	27.36
SO_4	6.51	6,58	6,57	–
O	6.51	6.44	6.50	6.60

In (1) and (2), the wt. of salt taken for analysis amounted to 0.3226 gm. and 0.332 gm. respectively; but in (3) the wt. was 1.969 gm. The filtrate from the calomel was tested with sulphureted hydrogen, which imparted only a brown coloration to the liquid, but not weighable precipitate was obtained. The result of analysis is not very satisfactory; but the method itself does not admit of a high degree of accuracy.

As a check upon the method of estimation of oxygen, pure oxide of mercury was analysed. The result is given below :–

	Theory	Found
Hg... ...	92.60	92.34
O... ...	7.40	7.36
	100.00	

It was thought desirable to prepare trimercuric sulphate by the ordinary method, namely by the action of sodium sulphate on a hot was washed and dried with the care described above (see p. 7). The result of anylysis is given below. The water was kindly estimated by direct method by Mr. C. Bhaduri B.A., Demonstrator, Chemical Laboratory, with scrupulos care and rigorous exactitude.

Calc. for		Found		
$HgSO_4.2HgO.\frac{1}{2}H_2O$		1	2	3
Hg	... 81.41	81.47	81.64	81.36
SO_4	... 13.02	13.78	–	–
H_2O	... 1.22	1.21		

As was to be expected a much purer product was obtained in this case. The anylyses recorded above are of three different preparations.

NOTE ON THE DECOMPOSITION OF MERCURIC SULPHATE UNDER HEAT :–when trimercuric sulphate is gradually heated it undergoes decomposition as pointed out above. When the brown liquid, before it is completely volatilised, is allowed to cool down qucikly, a white, porus, vitreous mass of mercuric sulphate is obtained. When this compound is heated it gradually decomposes, then fuses and is completely volatilised; the products being metallic mercury mercurous sulphate, oxygen and sulphur dioxide. The description in Roscoe and Schorlemmer's standard work is thus fully borne out by my own experiments. No sublimate of mercuric sulphate one case 0.331 gm. $HgSO_4$ yielded 6 mgs. of HgS in the filtrate from calomel when the solution of the sublimate of mercurous suphate the mercurous sulphate was warmed with dilute nitric acid to get it into solution, a small portion of it underwent oxidation.

Thus :

$$2\,HgSO_4 = Hg_2SO_4 + SO_2 + O_2 \quad \text{... (1)}$$

$$2\,HgSO_4 = Hg + SO_2 + O_2 \quad \text{... (2)}$$

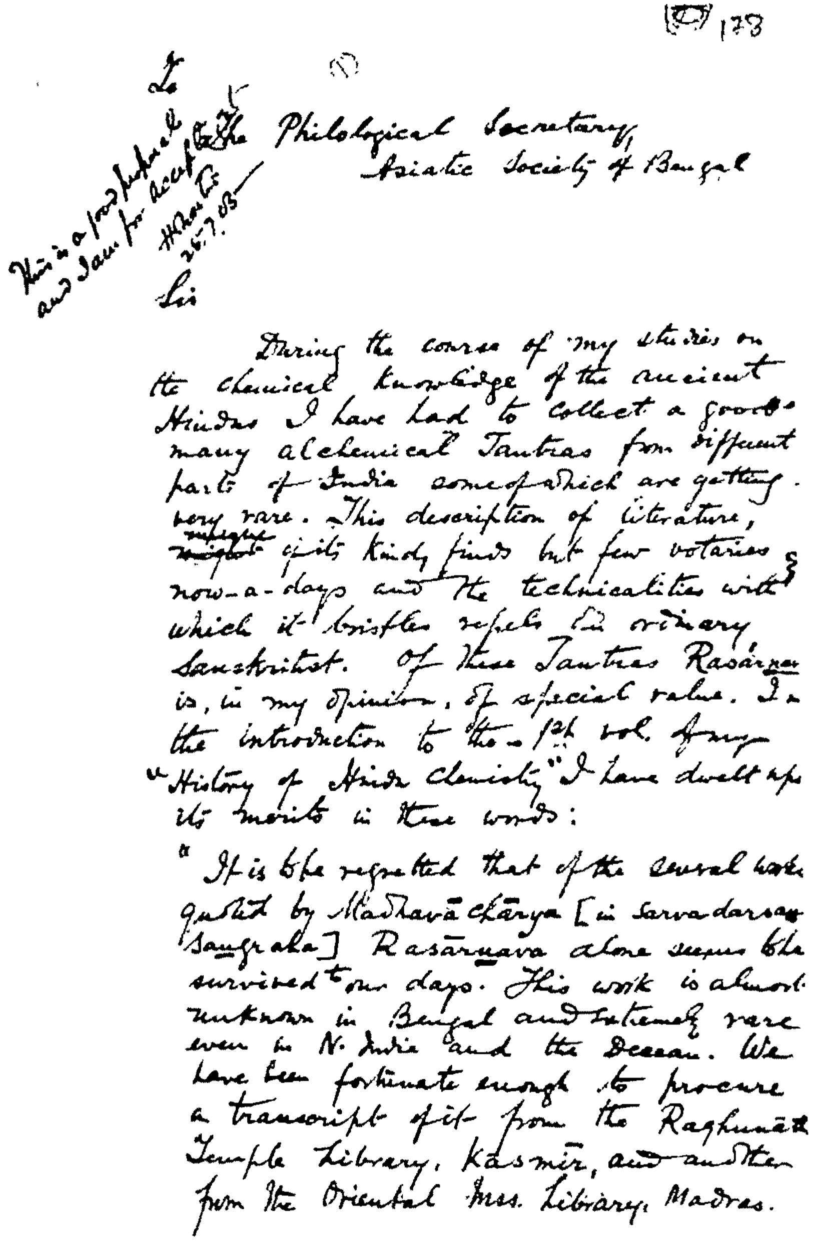
By far the larger proportion of the salt decomposes according to equation (1), a small portion only, sometimes less than one-fifth of the total quantity, breaks up according to (2).

Notes :

1. Journal Asiatic Society Vol. LXV, Pt. II, No. 1 P. 7. Zeit, anorg. Chem. (1896). p. 312.
2. Journal Chem. Soc., LXXI, 348.

3. Jour Chem. Soc. Trans. 1883, p. 443; *ibid*,. 1885, p. 231; *ibid.* 1886,p. 533.
4. Cf. "Bemerkenswerth fur alle Halogenverbindungen des Quecksilbers ist ihre grosse Widerstandsfahigkeit gegen conc. Schwefelsaure. Selbst in der Hitze wird durch diese das Halogen nur langsam ausgetrieben." Richert Lehrbuchder Anorog. chem. Ed. 1895 p. 384.
5. Annalen Bd. aga. Heft 3.357 Hantzsch: Zur Isomerie der Verbindungen $N_2O_2H_2$.
6. Vide Gretio's Hand Book : vol. VI. p. 29.
7. Vide Encycl, Chimiqe (Fremy). T. 3 eahier, 14. p. 154
8. Annalen, ed. 292, 184

Letters & Correspondance



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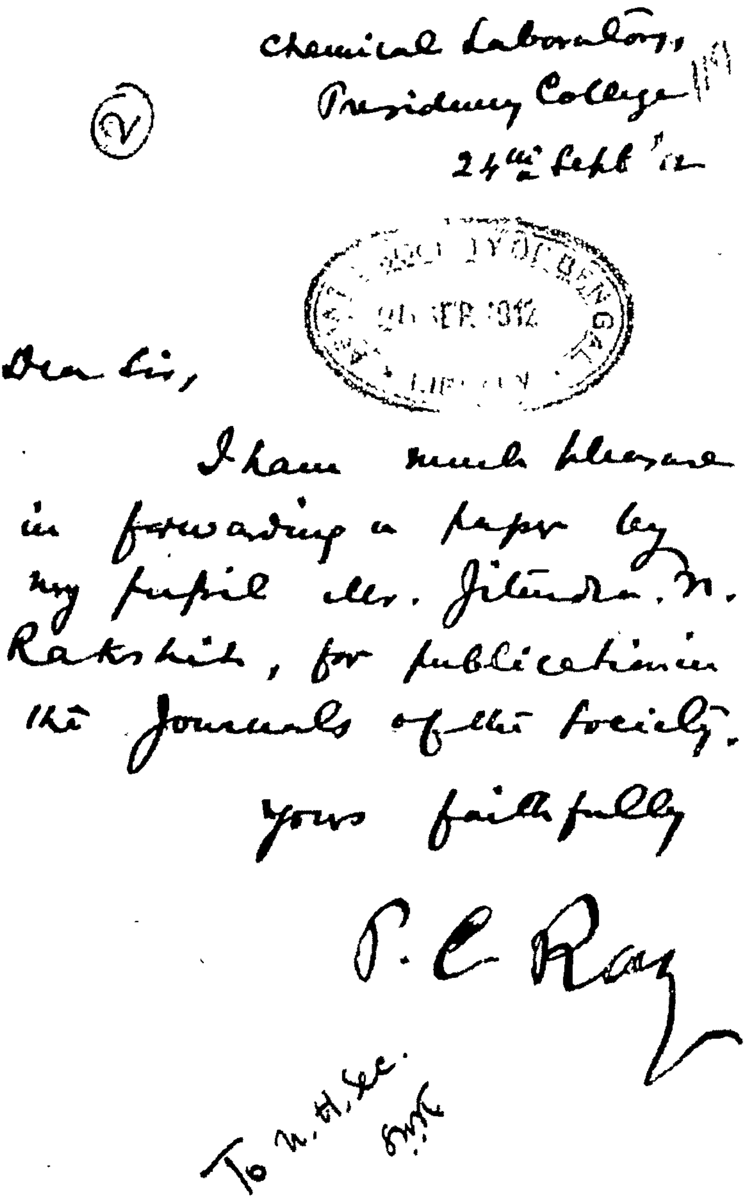
To
The Philological Secretary,
Asiatic Society of Bengal

This is a good proposal and I am for accepting
26.7.03

Sir

During the course of my studies on the chemical knowledge of the ancient Hindus I have had to collect a good many alchemical Tantras from different parts of India some of which are getting very rare. This description of literature, unique of its kind finds but few votaries now-a-days and the technicalities with which it bristles repels the ordinary Sanskritist. Of these Tantras Rasárnava is, in my opinion, of special value. In the introduction to the 1st vol. of my "History of Hindu Chemistry" I have dwelt upon its merits in these words:

"It is to be regretted that of the several works quoted by Mádhavāchārya [in Sarvadarsana Saṅgraha] Rasārṇava alone seems to have survived to our days. This work is almost unknown in Bengal and extremely rare even in N. India and the Deccan. We have been fortunate enough to procure a transcript of it from the Raghunāth Temple Library, Kāsmīr, and another from the Oriental Mss. Library, Madras.



Chemical Laboratory,
Presidency College
24th Sept '12

②

ASIATIC SOCIETY OF BENGAL
26 SEP 1912
LIBRARY

Dear Sir,

I have much pleasure in forwarding a paper by my pupil Mr. Jitendra. N. Rakshit, for publication in the Journals of the Society.

Yours faithfully

P. C. Ray

To N.H. Sec.

DRAFT. 127

Asiatic Society of Bengal.

To

Dr. P.C. Ray.

No. 192

Dated [illegible] 1912

Dear Sir,

I beg to acknowledge receipt of the four papers noted overleaf, forwarded by you for publication in the Society's Journal, which are receiving attention.

Please put on the [illegible] the date of receipt.

Yours.........

Hon. Secy.

Papers sent to [illegible]

Dy.

128

Constituents of Vernonia Anthelmintica Part I. By Kshiti Bhushan Bhaduri.

On Isomeric Allylamines, By Dr. P.C.Ray and Rasik Lal Datta.

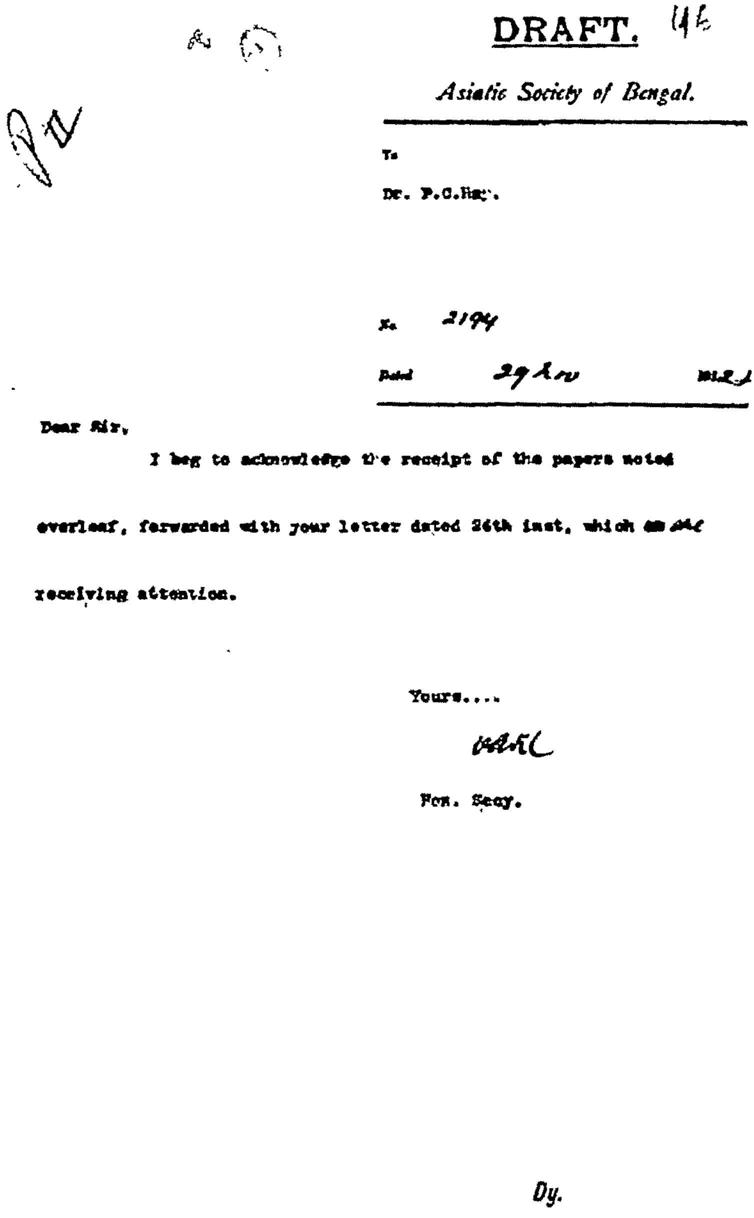
The Glucoside and oil of Caesalpina Bonducella. By Kshiti Bhushan Bhaduri

The Preparation and decomposition of Monochloro and Dichlorobenzylamines. By Rasik Lal Datta.

117

On a New Series of the Double Sulphates of Barium with the Sulphates of the Hetro-cyclic Ammonium Bases. By Rasik Lal Datta and Haridas Sen.

Zincoso-Zincic Chloride. By Haridas Sen.



DRAFT. 4b

Asiatic Society of Bengal.

To

Dr. P.C.Ray.

No. 2194

Dated 29 Nov 1921

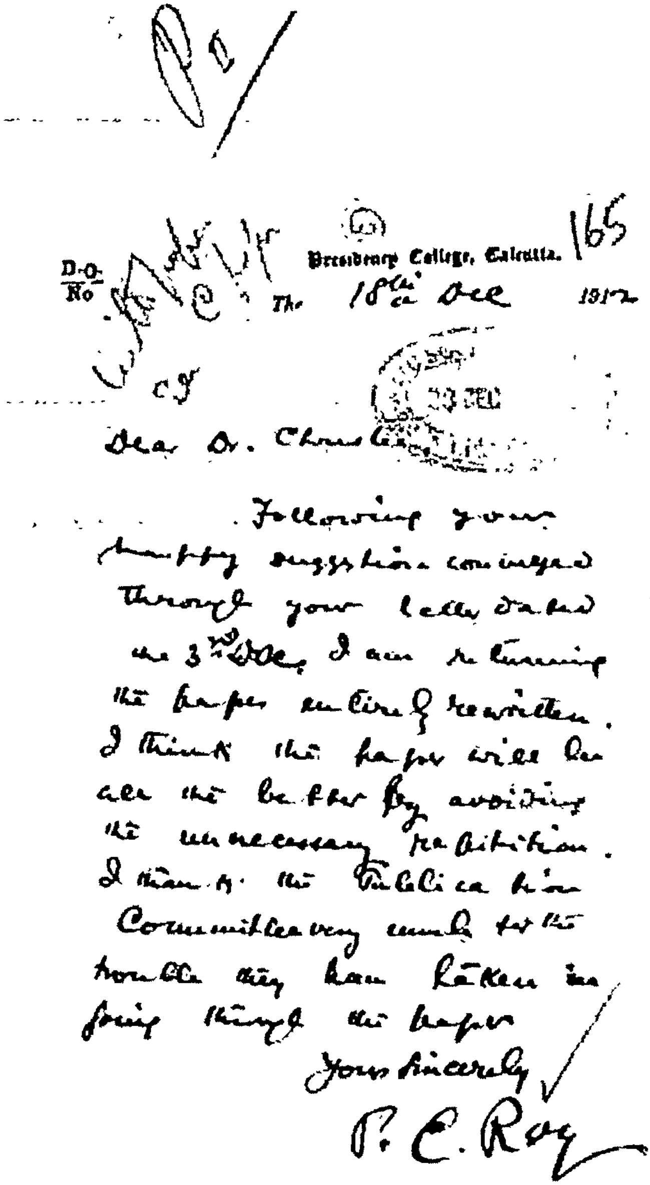
Dear Sir,

I beg to acknowledge the receipt of the papers noted overleaf, forwarded with your letter dated 26th inst, which are receiving attention.

Yours....

Hon. Secy.

Dy.



D.O. No

Presidency College, Calcutta. 165

The 18th Dec 1912

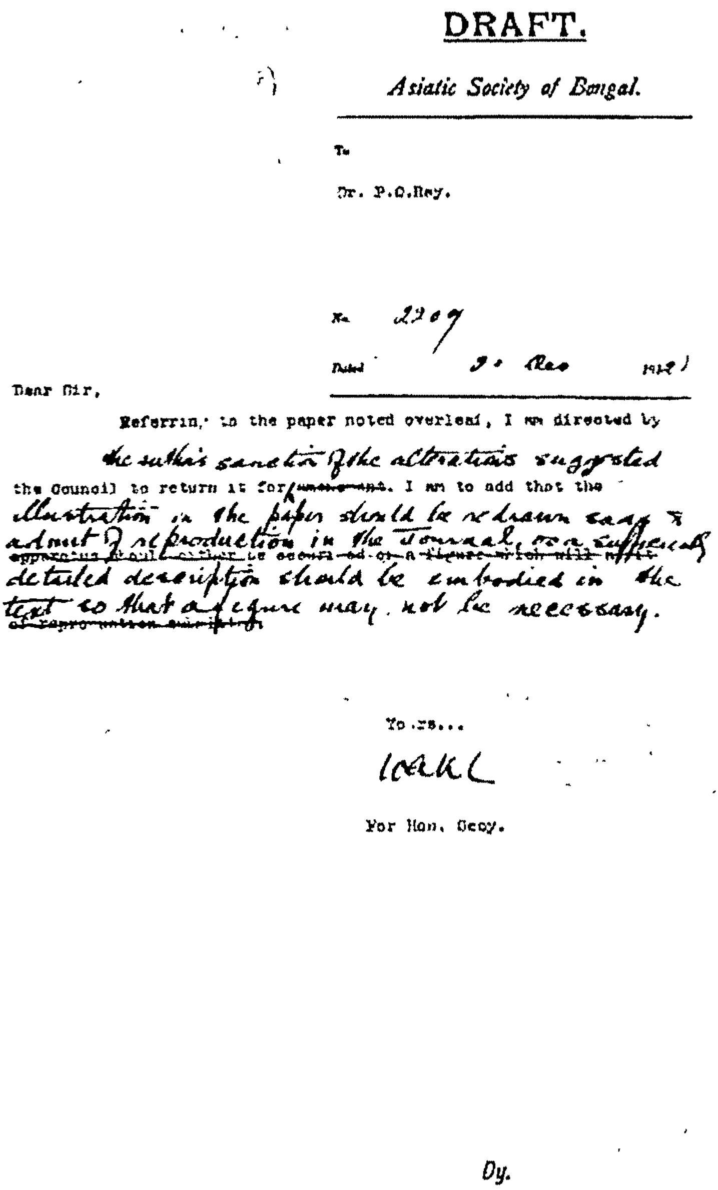
23 DEC

Dear Dr. [illegible]

Following your kindly suggestion conveyed through your letter dated the 3rd Dec, I am returning the paper entirely rewritten. I think the paper will be all the better by avoiding the unnecessary repetition. I thank the Publication Committee very much for the trouble they have taken in going through the paper.

Yours sincerely

P. C. Ray



DRAFT.

Asiatic Society of Bengal.

To

Dr. P.C.Ray.

No. 2207

Dated 9 Dec 1921

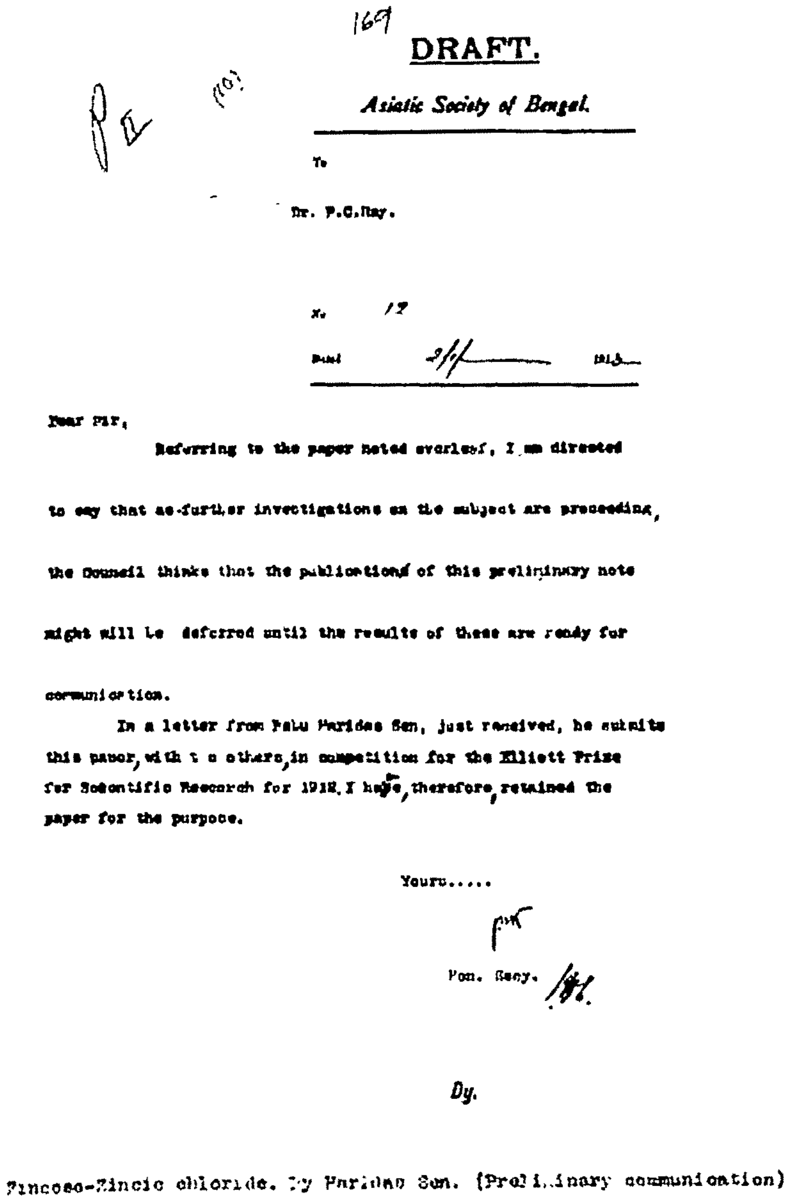
Dear Sir,

Referring to the paper noted overleaf, I am directed by the Council to return it for the author's sanction of the alterations suggested ~~amendment~~. I am to add that the illustration in the paper should be redrawn so as to admit of reproduction in the Journal, or a sufficiently ~~apparatus should either be accompanied or a figure which will admit~~ detailed description should be embodied in the text so that a figure may not be necessary. ~~of reproduction [illegible]~~

Yours...

For Hon. Secy.

Dy.



169

(10)

DRAFT.

Asiatic Society of Bengal.

To

Dr. P.C.Ray.

No. 17

Dated 2/1 1913

Dear Sir,

Referring to the paper noted overleaf, I am directed to say that as further investigations on the subject are proceeding, the Council thinks that the publications of this preliminary note might will be deferred until the results of these are ready for communication.

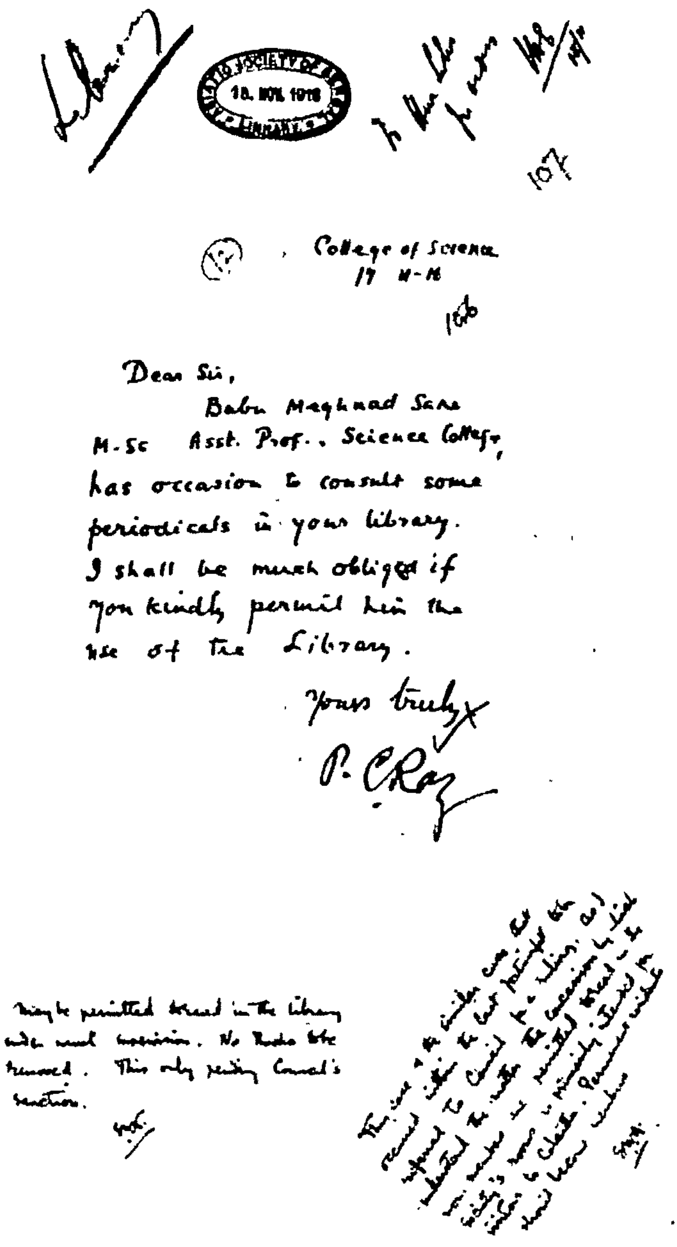
In a letter from Babu Haridas Sen, just received, he submits this paper, with two others, in competition for the Elliott Prize for Scientific Research for 1912. I have, therefore, retained the paper for the purpose.

Yours.....

Hon. Secy.

Dy.

Zincoso-Zincic chloride. By Haridas Sen. (Preliminary communication)



Library

ASIATIC SOCIETY OF BENGAL
18. NOV. 1918
LIBRARY

To the [illegible] 18/11/18

107

College of Science
17-11-18

180

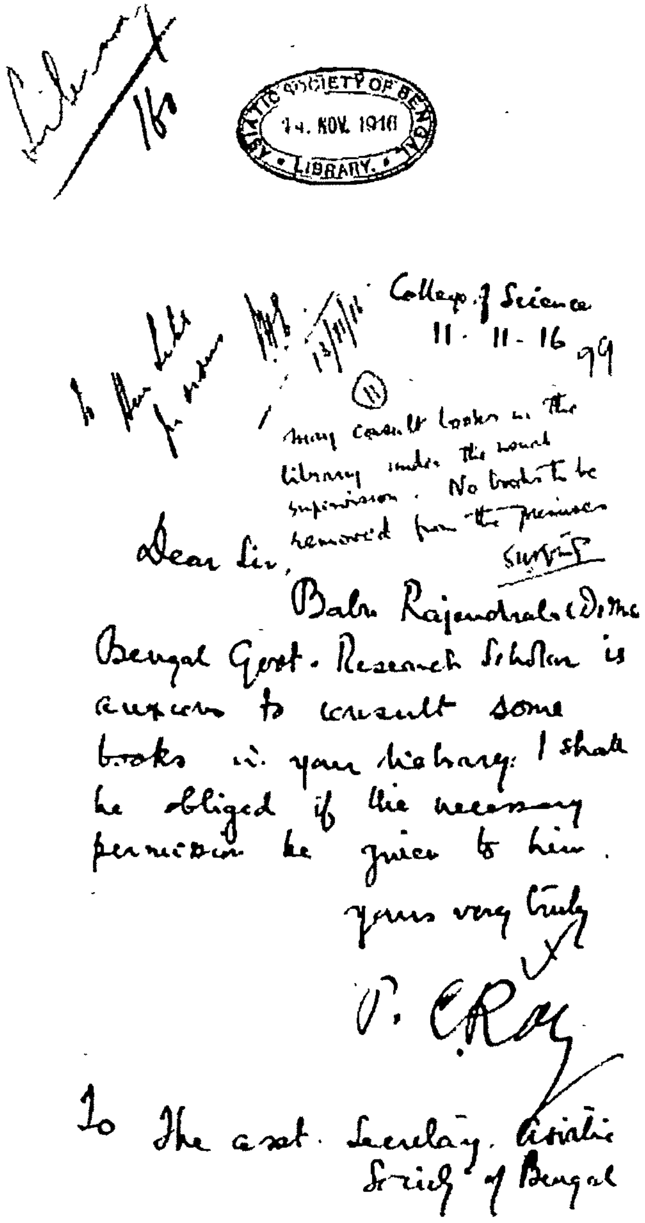
Dear Sir,

Babu Meghnad Saha M.Sc Asst. Prof., Science College, has occasion to consult some periodicals in your library. I shall be much obliged if you kindly permit him the use of the Library.

Yours truly
P. C. Ray

May be permitted to read in the Library under usual supervision. No books to be removed. This only pending Council's sanction.

The case of a similar case last received after the last [illegible] the referred to Council for ruling, and understand the matter the Council [illegible] any member be permitted to read [illegible] visiting [illegible] is primarily [illegible] for visitors to Calcutta. Permission [illegible] should [illegible]



ASIATIC SOCIETY OF BENGAL
14. NOV. 1916
LIBRARY.

To the Libn for orders 13/11/16

College of Science
11 · 11 - 16 99

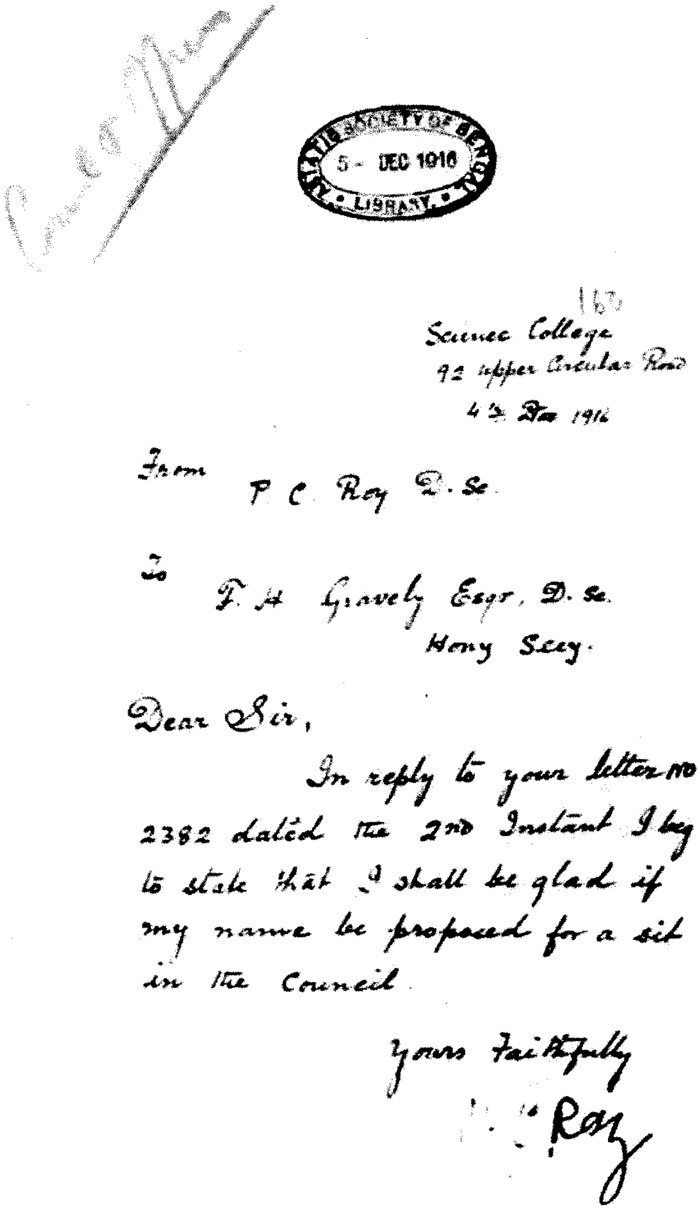
(11) May consult books in the library under the usual supervision. No books to be removed from the premises.

Dear Sir,

Babu Rajendralal De the Bengal Govt. Research Scholar is anxious to consult some books in your library. I shall be obliged if the necessary permission be given to him.

Yours very truly
P. C. Ray

To The Asst. Secretary, Asiatic Society of Bengal



[illegible]

ASIATIC SOCIETY OF BENGAL
5 - DEC 1916
LIBRARY

163

Science College
92 upper Circular Road
4th Dec 1916

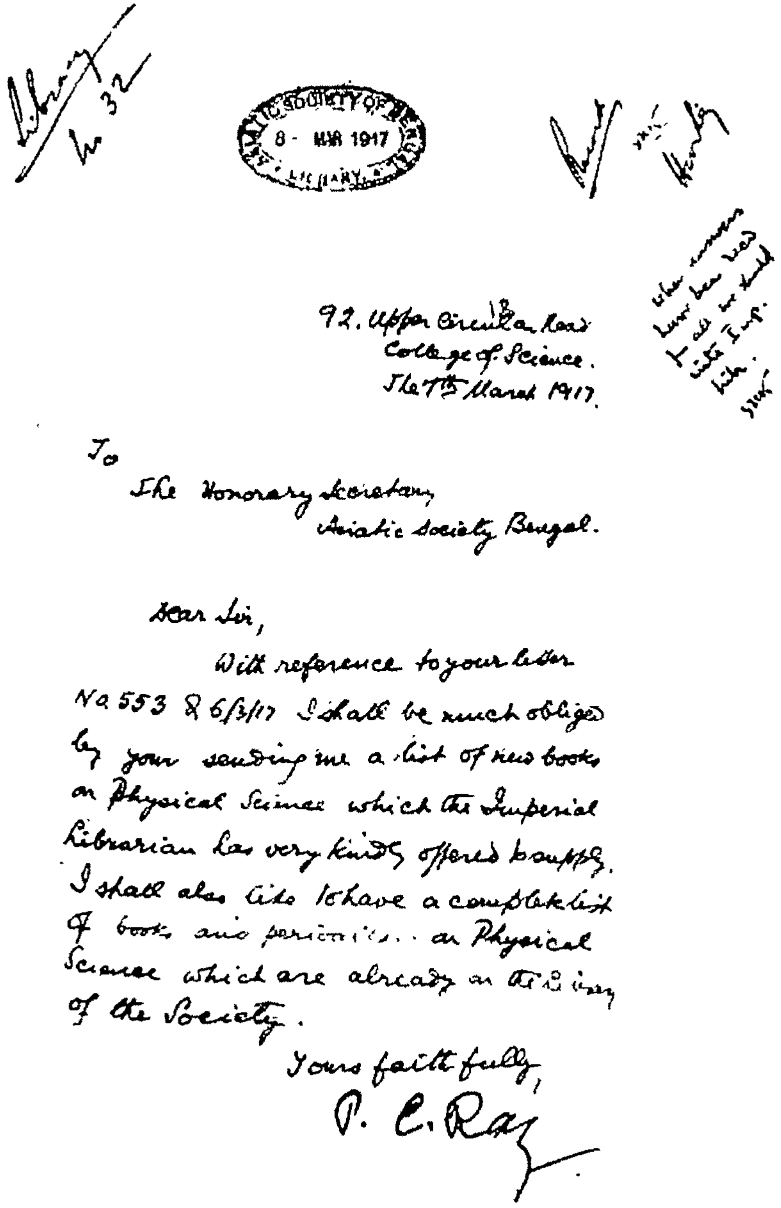
From
P. C. Roy D. Sc.

To
F. H. Gravely Esqr. D. Sc.
Hony Secy.

Dear Sir,

In reply to your letter no 2382 dated the 2nd Instant I beg to state that I shall be glad if my name be proposed for a sit in the Council.

Yours faithfully
P. C. Ray



Library
W 32

ASIATIC SOCIETY OF BENGAL
8 - MAR 1917
LIBRARY

The numbers have been [illegible] to all [illegible] with Imp. Lib.
[illegible]

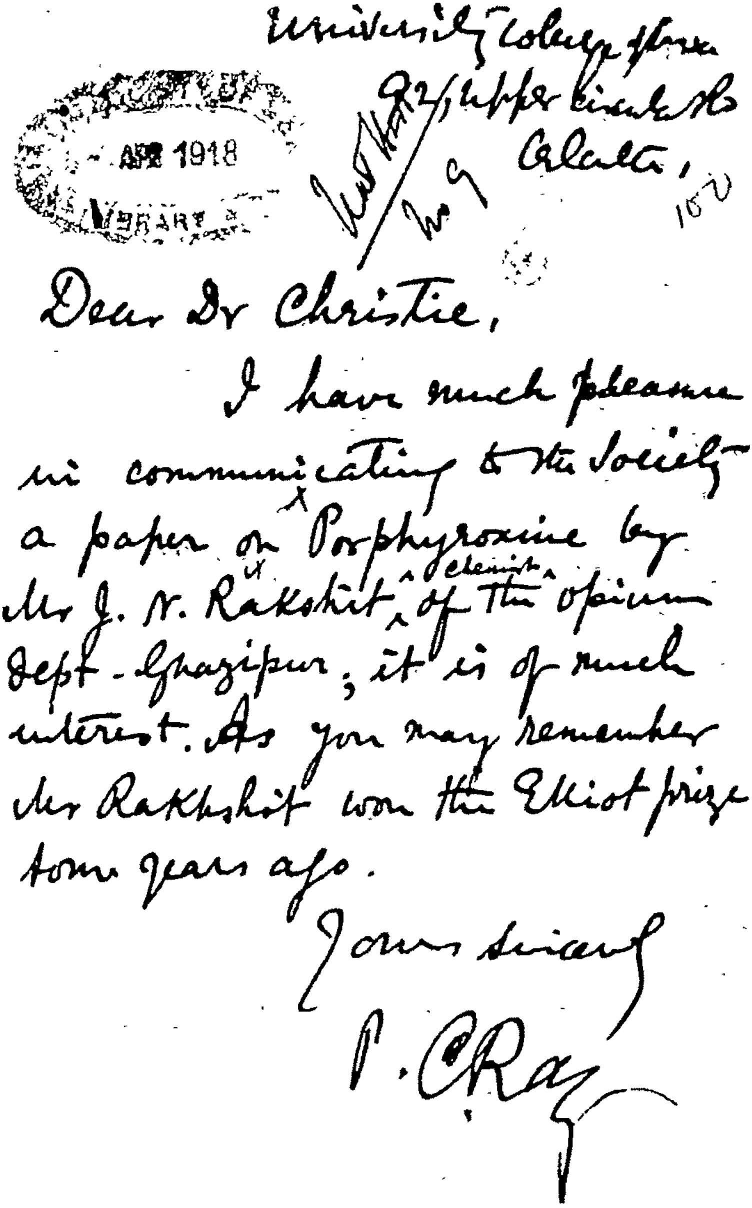
92, Upper Circular Road
College of Science.
The 7th March 1917.

To
The Honorary Secretary,
Asiatic Society Bengal.

Dear Sir,

With reference to your letter No 553 d/ 6/3/17 I shall be much obliged by your sending me a list of new books on Physical Science which the Imperial Librarian has very kindly offered to supply. I shall also like to have a complete list of books and periodicals on Physical Science which are already in the library of the Society.

Yours faithfully,
P. C. Ray



University College of Science
92, Upper Circular Rd
Calcutta,

APR 1918
LIBRARY

[illegible]

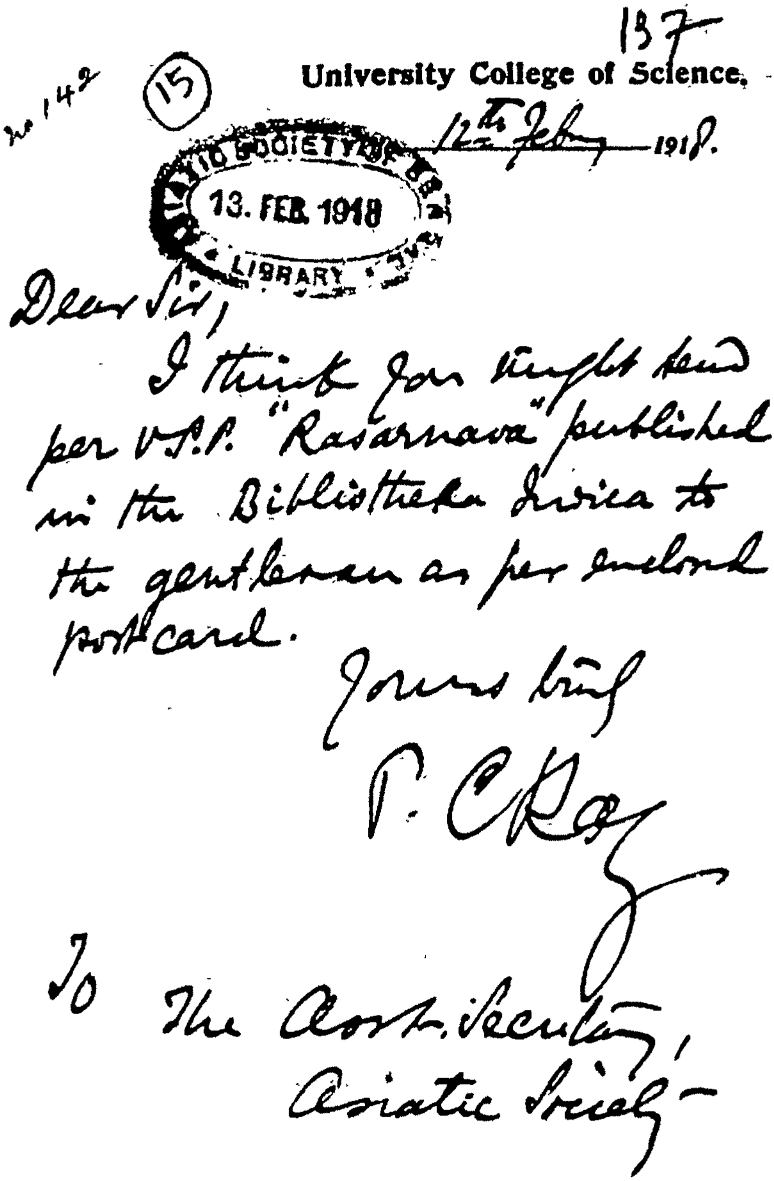
102

Dear Dr Christie,

I have much pleasure in communicating to the Society a paper on Porphyroxine by Mr J. N. Rakshit, chemist of the Opium Dept. Ghazipur; it is of much interest. As you may remember Mr Rakkshit won the Elliot prize some years ago.

Yours sincerely

P. C. Ray



137

no 142

(15)

University College of Science,

12th Feby 1918.

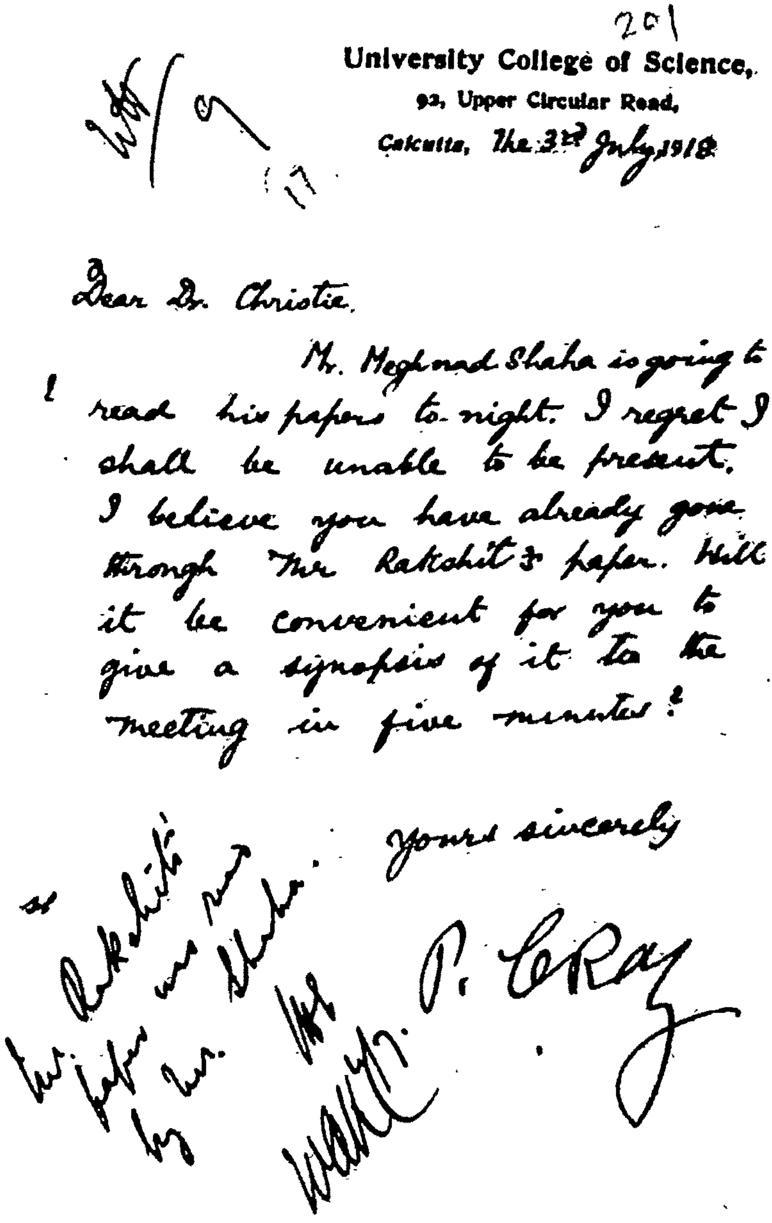
13. FEB. 1918
LIBRARY

Dear Sir,

I think you might send per V.P.P. "Rasarnava" published in the Bibliotheka Indica to the gentleman as per enclosed postcard.

Yours truly
P. C. Ray

To The Asst. Secretary,
Asiatic Society



201

University College of Science,
92, Upper Circular Road,
Calcutta, the 3rd July 1918

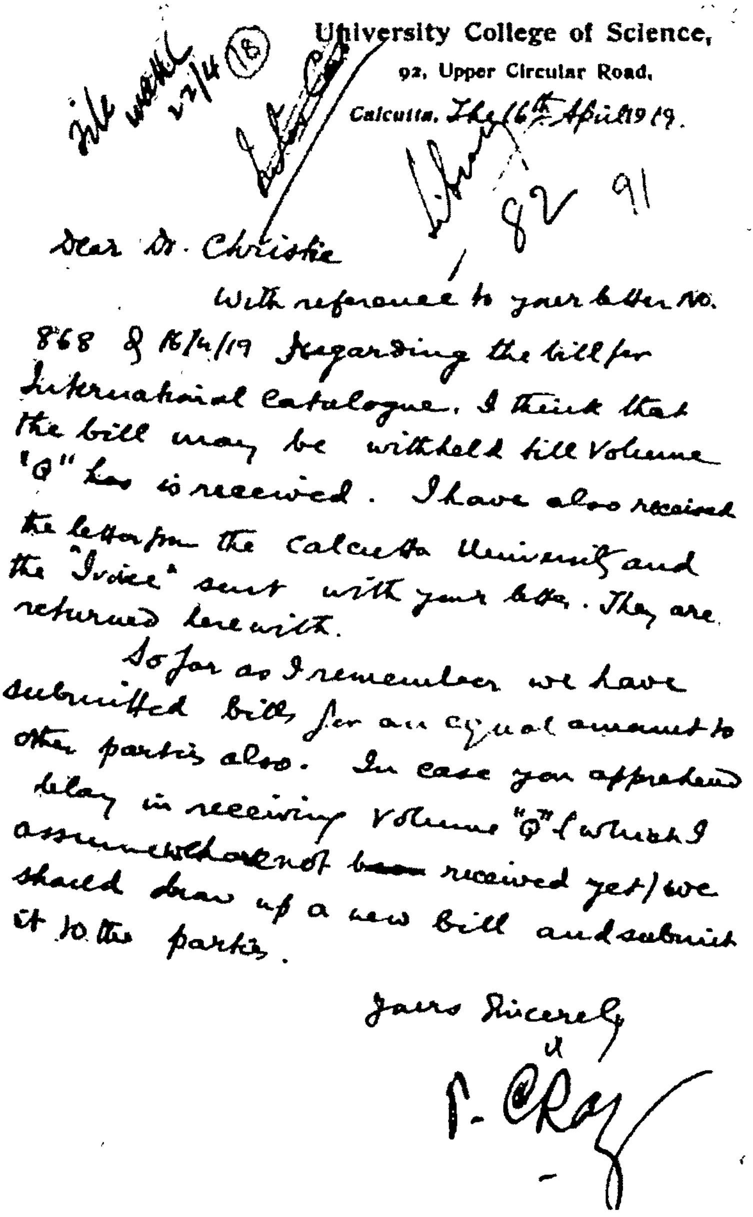
17

Dear Dr. Christie,

Mr. Meghnad Shaha is going to read his papers to-night. I regret I shall be unable to be present. I believe you have already gone through Mr Rakshit's paper. Will it be convenient for you to give a synopsis of it to the meeting in five minutes?

Yours sincerely
P. C. Ray

Mr. Rakshit's paper was read by Mr. Saha.
WAHC



file with 22/4 (18)

82 91

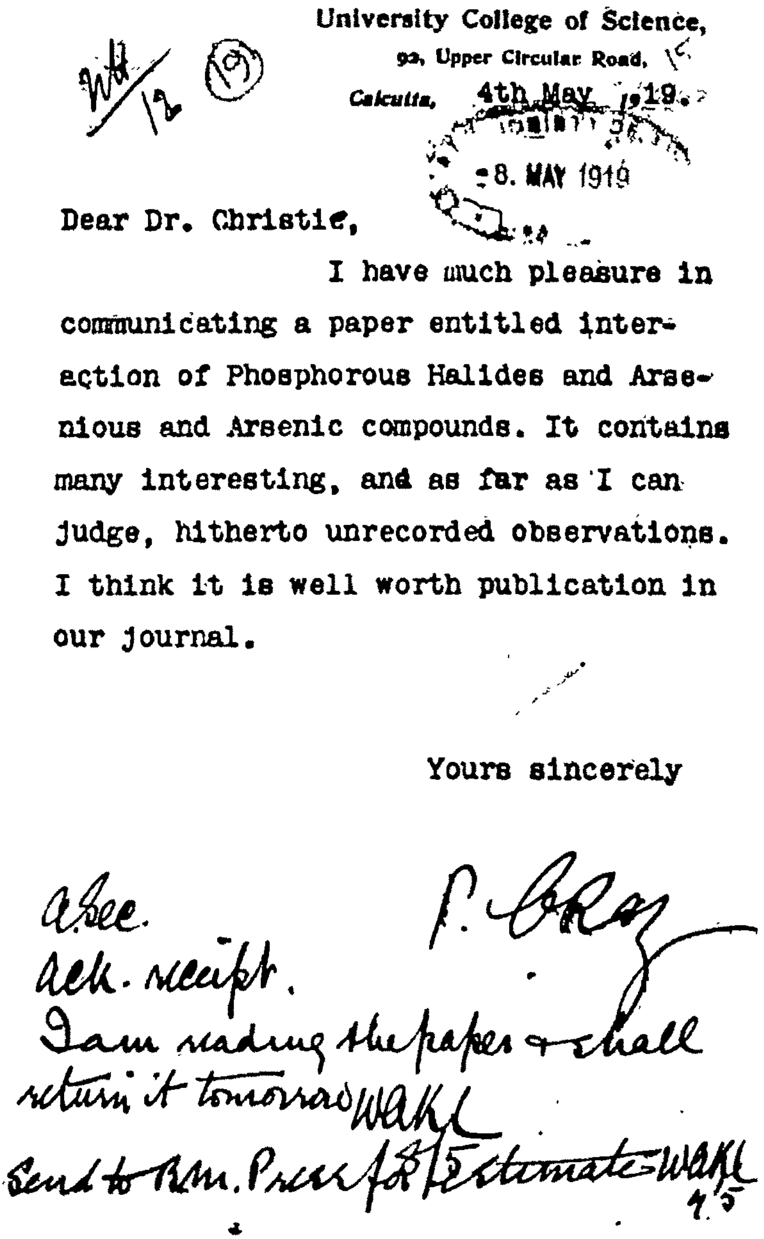
University College of Science,
92, Upper Circular Road,
Calcutta. The 16th April 1919.

Dear Dr. Christie

With reference to your letter No. 868 of 16/4/19 regarding the bill for International Catalogue, I think that the bill may be withheld till Volume "Q" ~~has~~ is received. I have also received the letter from the Calcutta University and the "Index" sent with your letter. They are returned herewith.

So far as I remember we have submitted bills for an equal amount to other parties also. In case you apprehend delay in receiving Volume "Q" (which I assume will have not ~~been~~ received yet) we shall draw up a new bill and submit it to the parties.

Yours Sincerely
P. C. Ray



University College of Science,
92, Upper Circular Road,
Calcutta, 4th May 1919.

wth/12 ⑲

8. MAY 1919

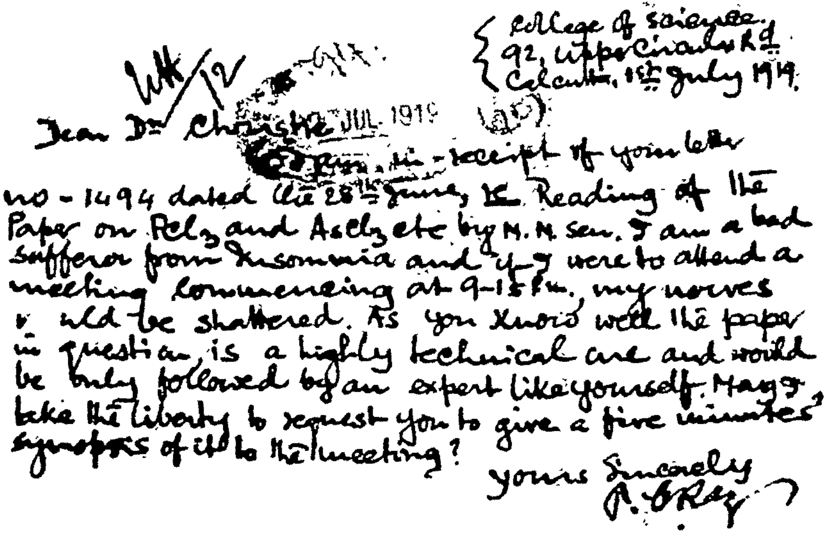
Dear Dr. Christie,

I have much pleasure in communicating a paper entitled interaction of Phosphorous Halides and Arsenious and Arsenic compounds. It contains many interesting, and as far as I can judge, hitherto unrecorded observations. I think it is well worth publication in our journal.

Yours sincerely

P. C. Ray

a.see.
ack. receipt.
I am reading the paper & shall return it tomorrow WAKC
Send to B.M. Press for Estimate WAKC
7.5



College of Science.
92, Upper Circular Rd.
Calcutta, 1st July 1919.

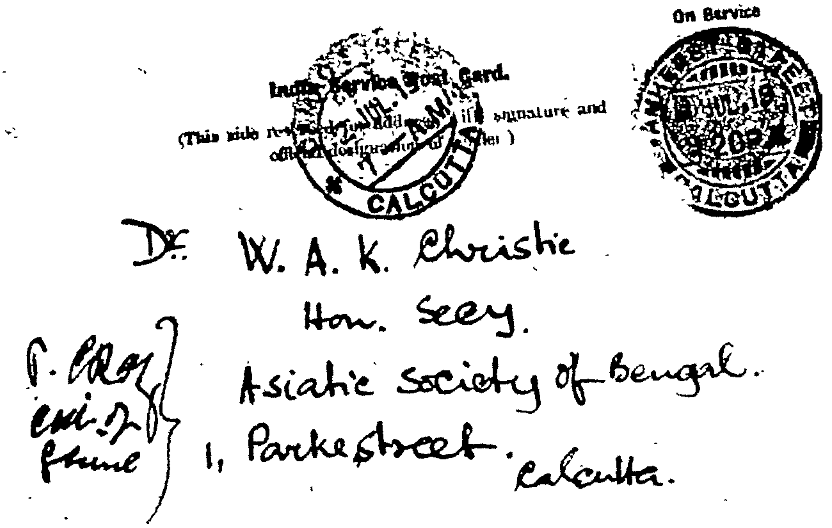
WK/12

2 JUL 1919

Dear Dr Christie

[illegible] in receipt of your letter no - 1494 dated the 28th June, re. Reading of the Paper on Pelz and Aselz etc by M. N. Sen. I am a bad sufferer from Insomnia and if I were to attend a meeting commencing at 9-15 P.M. my nerves w'ld be shattered. As you know well the paper in question is a highly technical one and would be only followed by an expert like yourself. May I take the liberty to request you to give a five minutes' synopsis of it to the meeting?

Yours Sincerely
P. C. Ray



On Service

India Service Post Card.
(This side reserved for address with signature and official designation of sender.)

CALCUTTA

Dr. W. A. K. Christie
Hon. Secy.
Asiatic Society of Bengal.
1, Park Street.
Calcutta.

P. C. Ray
Coll. of
Science

DRAFT. 123

P II (A)

Asiatic Society of Bengal.

To

Dr. P.C. Ray.

No. 1877

Dated 28/9 1912.

Dear Sir,

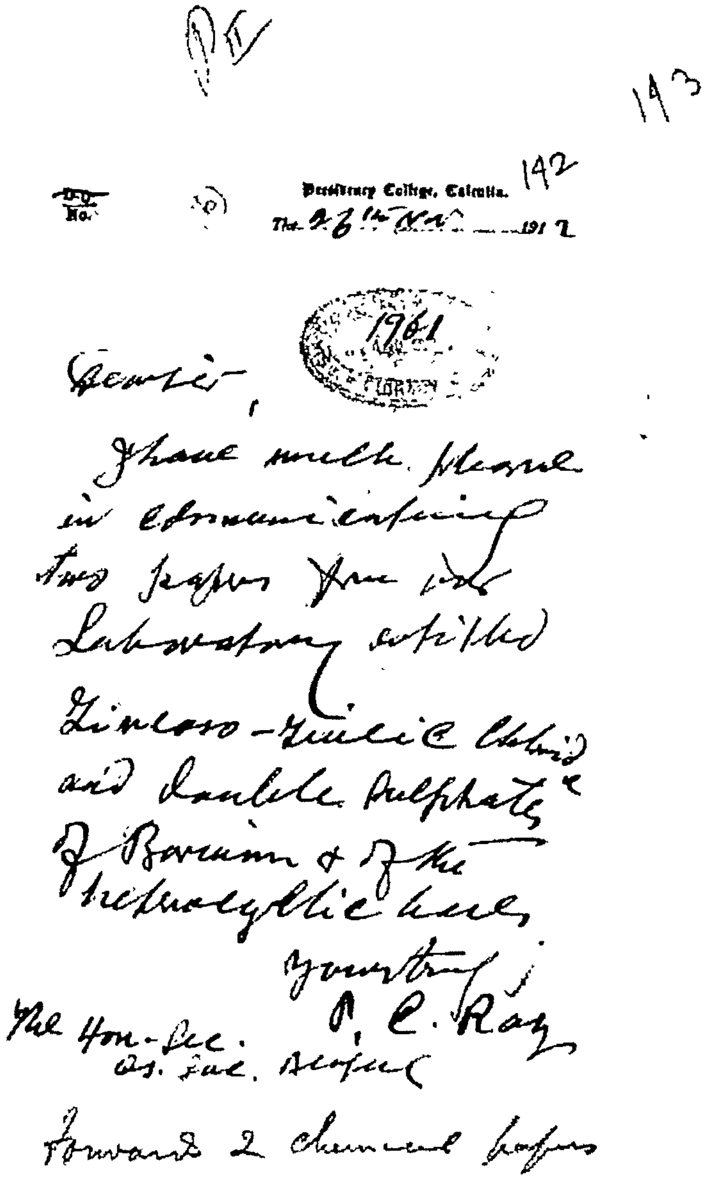
I beg to acknowledge the receipt of the paper entitled Action of Stannic Chloride on Phenylhydrazine, by Jitendra Nath Rakshit, forwarded with your letter dated 24th Sept. 1912, which is receiving attention.

Yours...

Hon. Secy.

Refer and [illegible]

Dy.



143

D.O.
No.

Presidency College, Calcutta. 142
The 26th Nov. 1912

1961
LIBRARY

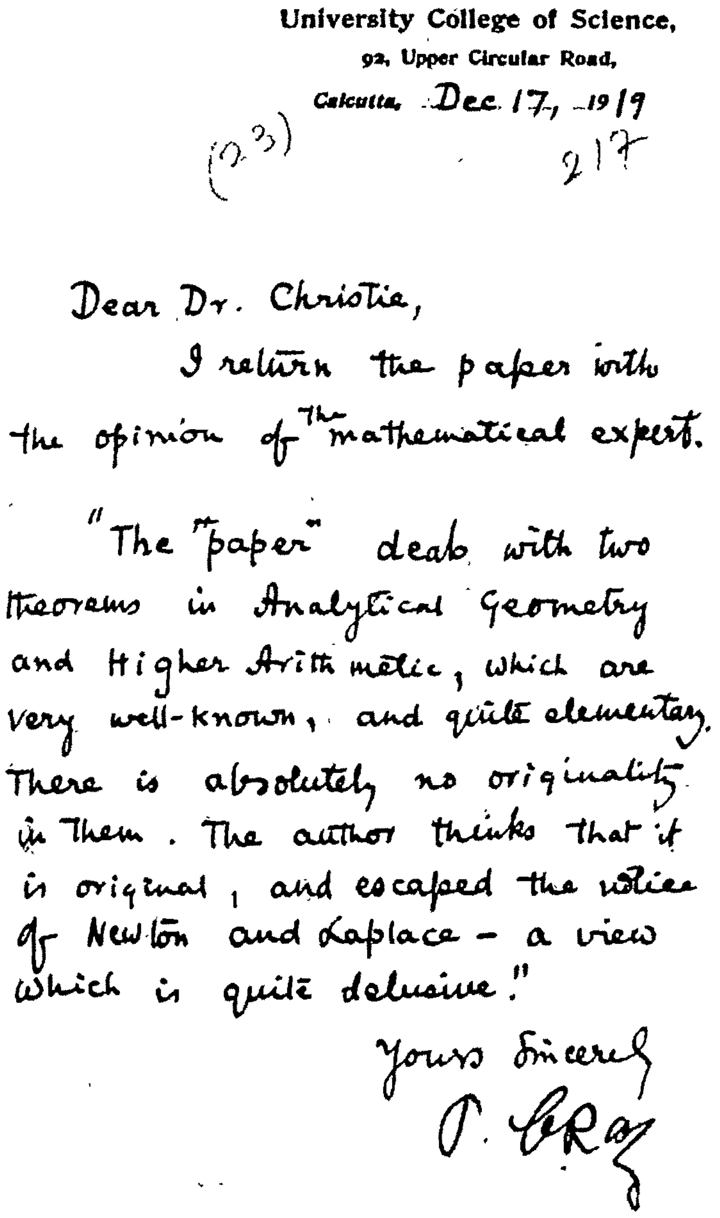
Dear Sir,

I have much pleasure in communicating two papers from this Laboratory entitled Zincoso-Zincic Chloride and Double Sulphates of Barium & of the tetralkylic bases.

Yours truly,
P. C. Ray

The Hon. Sec.
As. Soc. Bengal

Forward 2 chemical papers



University College of Science,
92, Upper Circular Road,
Calcutta, Dec. 17, 1919

(23)

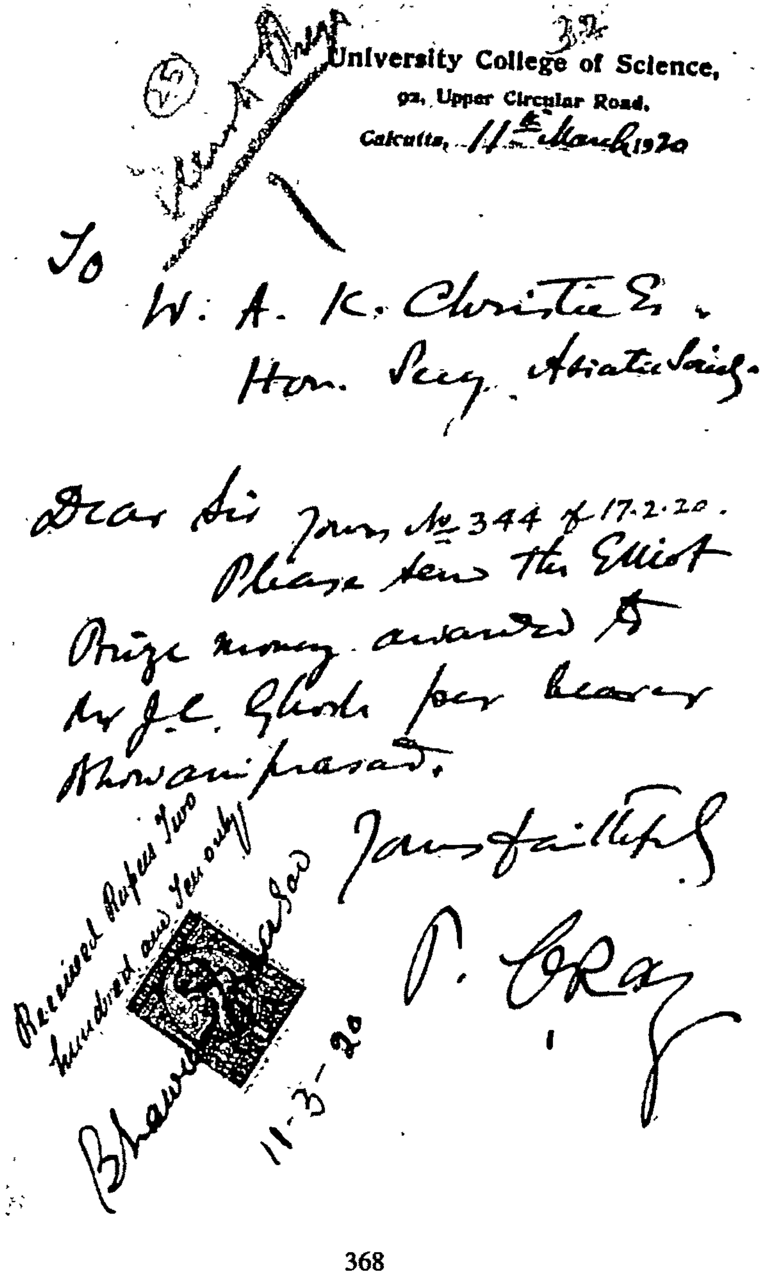
217

Dear Dr. Christie,

I return the paper with the opinion of the mathematical expert.

"The "paper" deals with two theorems in Analytical Geometry and Higher Arithmetic, which are very well-known, and quite elementary. There is absolutely no originality in them. The author thinks that it is original, and escaped the notice of Newton and Laplace — a view which is quite delusive."

Yours Sincerely
P. C. Ray



University College of Science,
92, Upper Circular Road,
Calcutta, 11th March 1920

To
W. A. K. Christie Esq.
Hon. Secy. Asiatic Socy.

Dear Sir Yours No 344 of 17.2.20.
Please send the Elliot Prize money awarded to Mr J. C. Ghosh per bearer Bhowaniprasad.

Yours faithfully
P. C. Ray

Received Rupees Two hundred and Ten only
Bhawani Prasad
11-3-20

152

Action of Stannic Chloride on Phenylhydrazine. By Jitendra Nath Rakhsit. Communicated by Dr. P.C.Ray.

Draft. 31

No. 344

Dated. 17/4 1930.

To

Sir P. C. Ray, Kt. C. I. E.

Dear Sir,

Will you kindly send a

messenger

responsible ~~man~~ to receive the

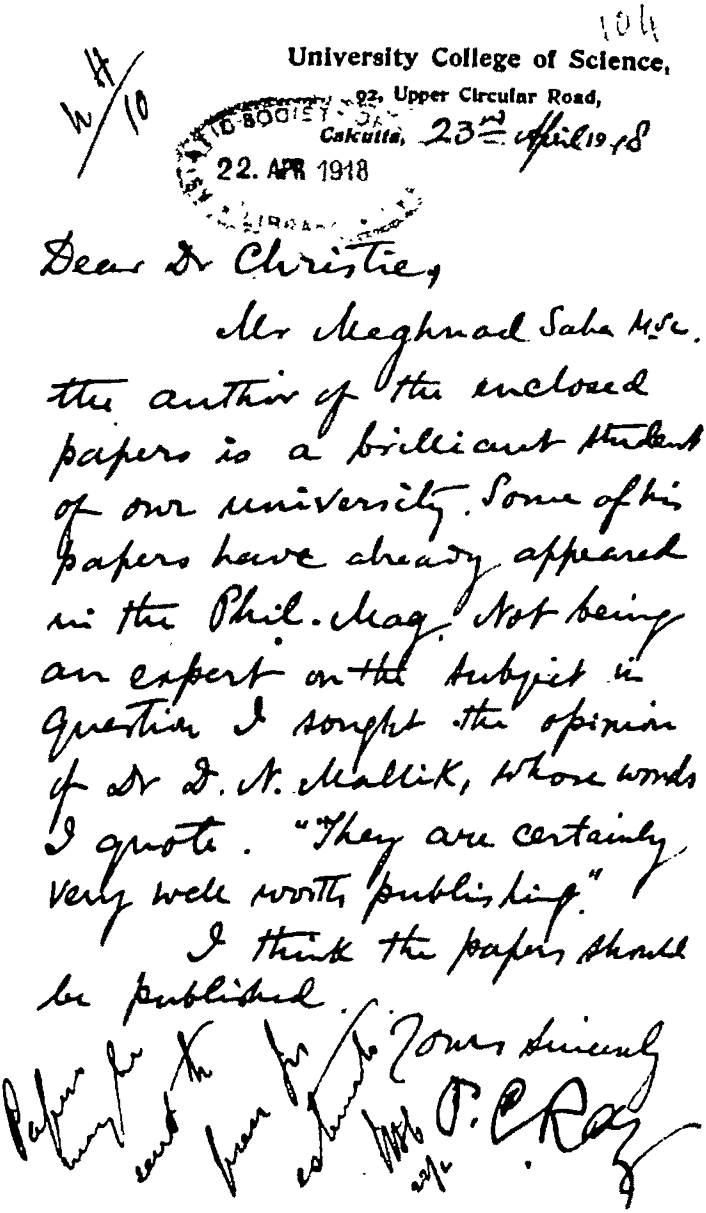
money

Elliott Prize awarded to Mr. J. C.

Ghosh and by him made payable to you.

Yours faithfully,

Hony. Secretary.



1014

W H/10

University College of Science,
92, Upper Circular Road,
Calcutta, 23rd April 1918

22. APR 1918

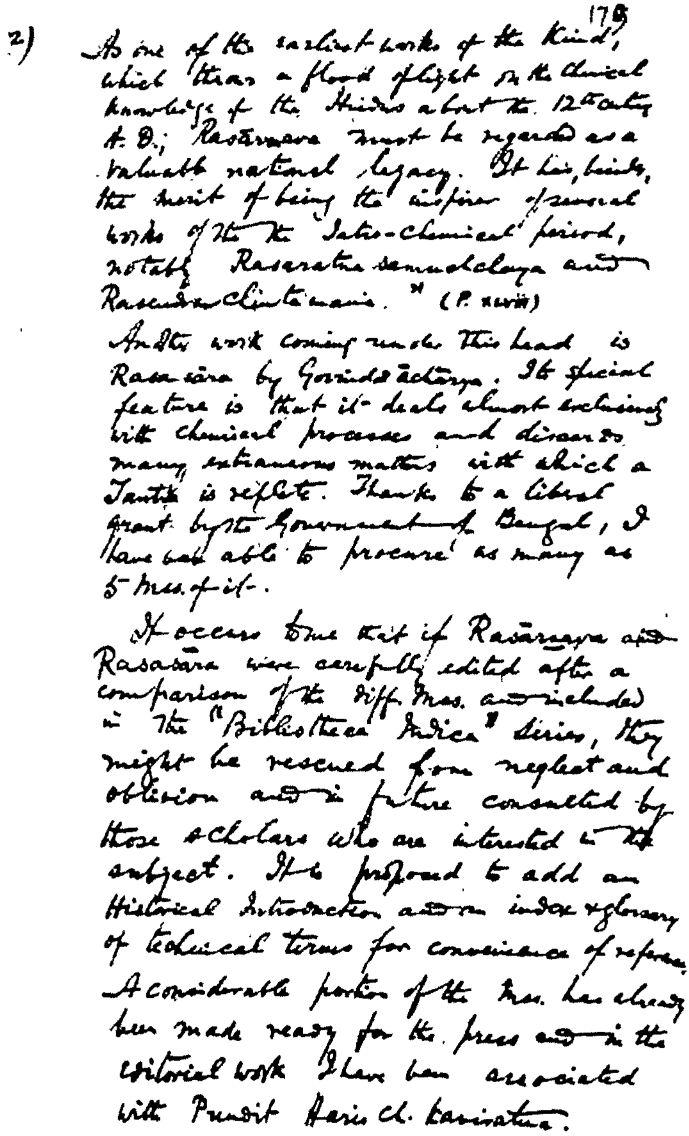
Dear Dr Christie,

Mr Meghnad Saha M.Sc. the author of the enclosed papers is a brilliant student of our university. Some of his papers have already appeared in the Phil. Mag. Not being an expert on the subject in question I sought the opinion of Dr D. N. Mallik, whose words I quote. "They are certainly very well worth publishing."

I think the papers should be published.

Yours sincerely
P. C. Ray

Paper may be sent to the press for estimate
27/4

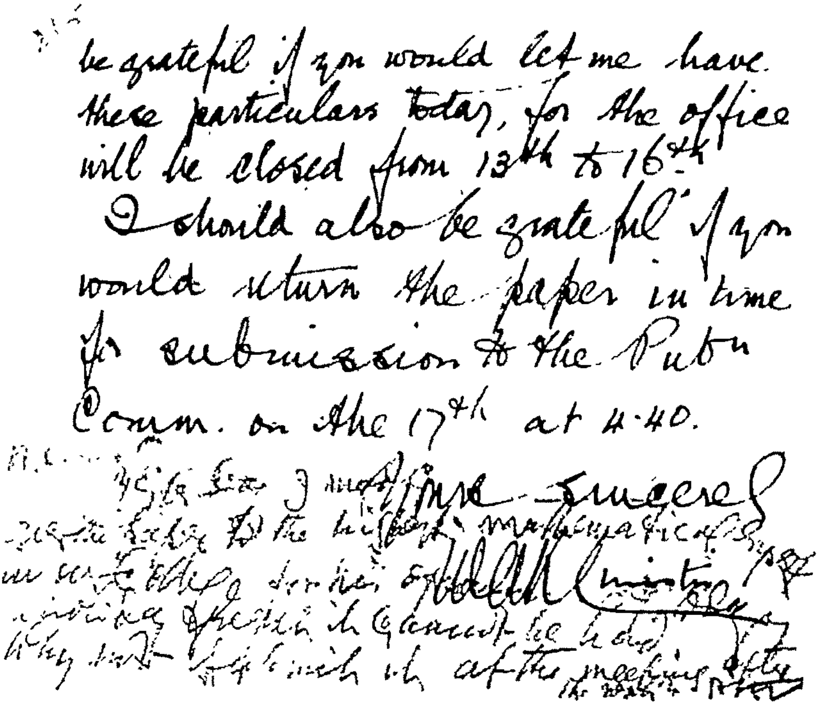


179

2) As one of the earliest works of the kind, which throws a flood of light on the chemical knowledge of the Hindus about the 12th century A. D.; Rasārṇava must be regarded as a valuable national legacy. It has, besides, the merit of being the inspirer of several works of the the 'Iatro-chemical' period, notably Rasaratna samuccaya and Rasendra Chintamani." (P. xxviii)

Another work coming under this head is Rasasāra by Govinda ācharya. Its special feature is that it deals almost exclusively with chemical processes and discards so many extraneous matters with which a Tantra is replete. Thanks to a liberal grant by the Government of Bengal, I have been able to procure as many as 5 Mss. of it.

It occurs to me that if Rasārṇava and Rasasāra were carefully edited after a comparison of the diff. Mss. and included in the "Bibliotheca Indica" series, they might be rescued from neglect and oblivion and in future consulted by those scholars who are interested in the subject. It is proposed to add an Historical Introduction and an index & glossary of technical terms for convenience of reference. A considerable portion of the Mss. has already been made ready for the press and in the editorial work I have been associated with Pundit Haris Ch. Kaviratna.

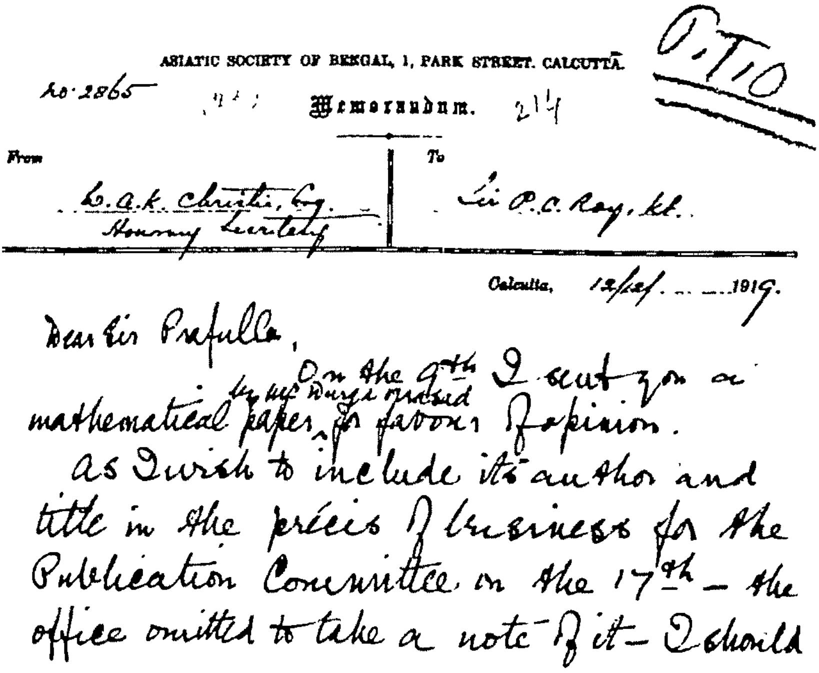


be grateful if you would let me have these particulars today, for the office will be closed from 13th to 16th.

I should also be grateful if you would return the paper in time for submission to the Pubn Comm. on the 17th at 4.40.

Yours sincerely

[illegible] I must [illegible]
[illegible] the history of mathematics [illegible]
[illegible]
[illegible]
[illegible] at the meeting of the [illegible]



O.T.10

ASIATIC SOCIETY OF BENGAL, 1, PARK STREET, CALCUTTA.

No. 2865

Memorandum. 214

From

W. A. K. Christie, Esq.
Honorary Secretary

To

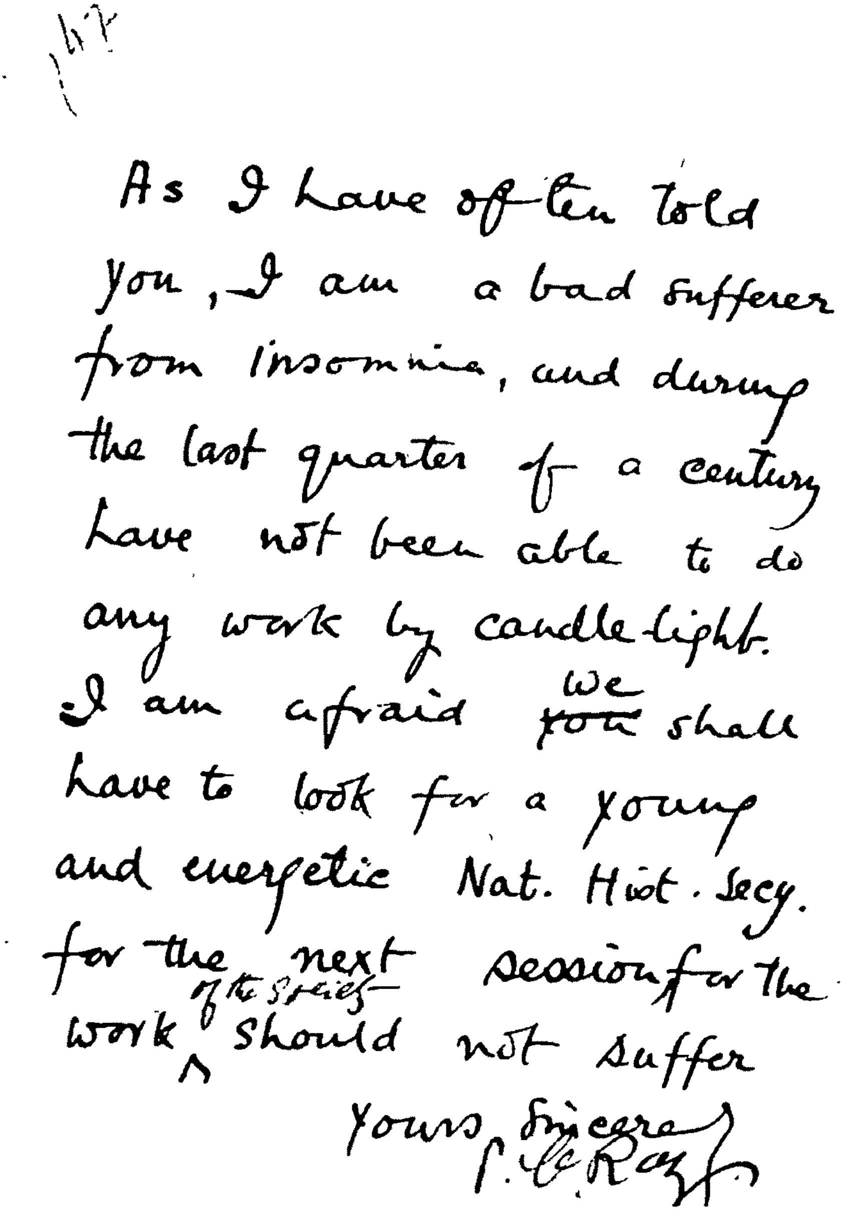
Sir P. C. Ray, Kt.

Calcutta, 12/12/ 1919.

Dear Sir Prafulla,

On the 9th I sent you a mathematical paper by Mr [illegible] enclosed for favour of opinion.

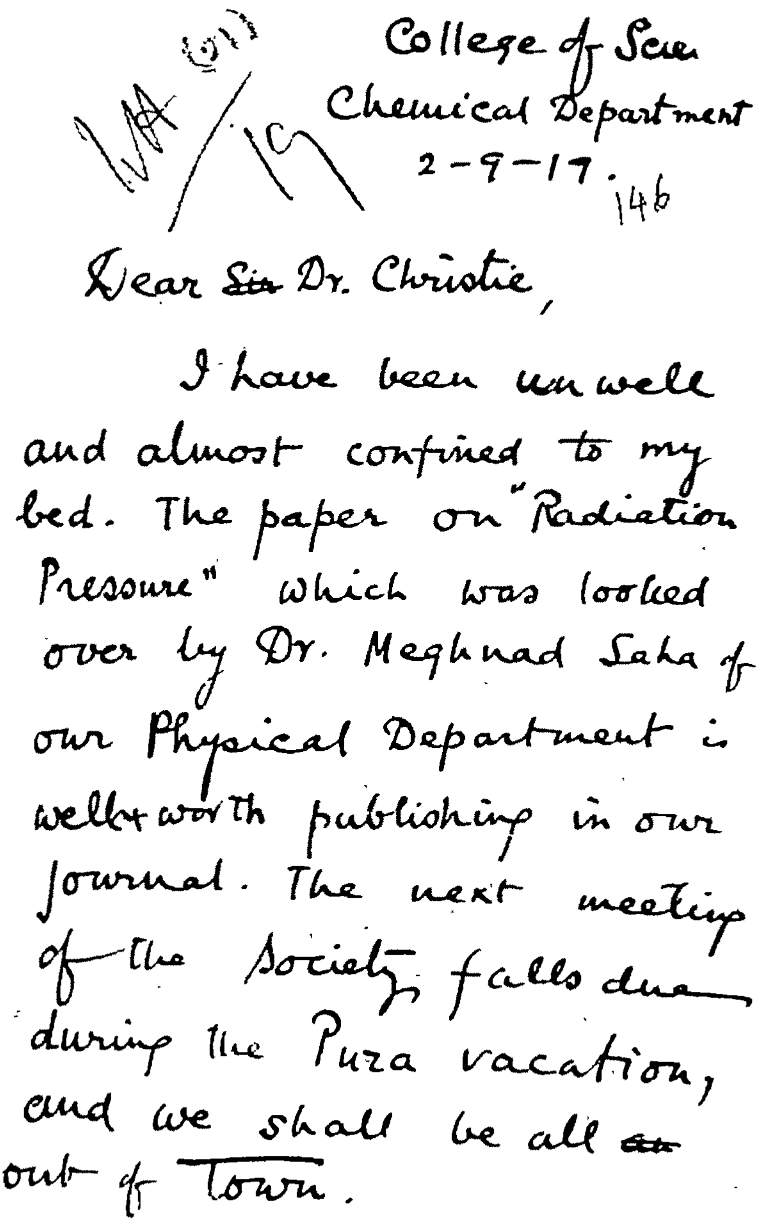
As I wish to include its author and title in the précis of business for the Publication Committee on the 17th – the office omitted to take a note of it – I should



147

As I have often told
you, I am a bad sufferer
from insomnia, and during
the last quarter of a century
have not been able to do
any work by candle-light.
I am afraid ~~you~~ we shall
have to look for a young
and energetic Nat. Hist. Secy.
for the next session for the
work of the Society should not suffer

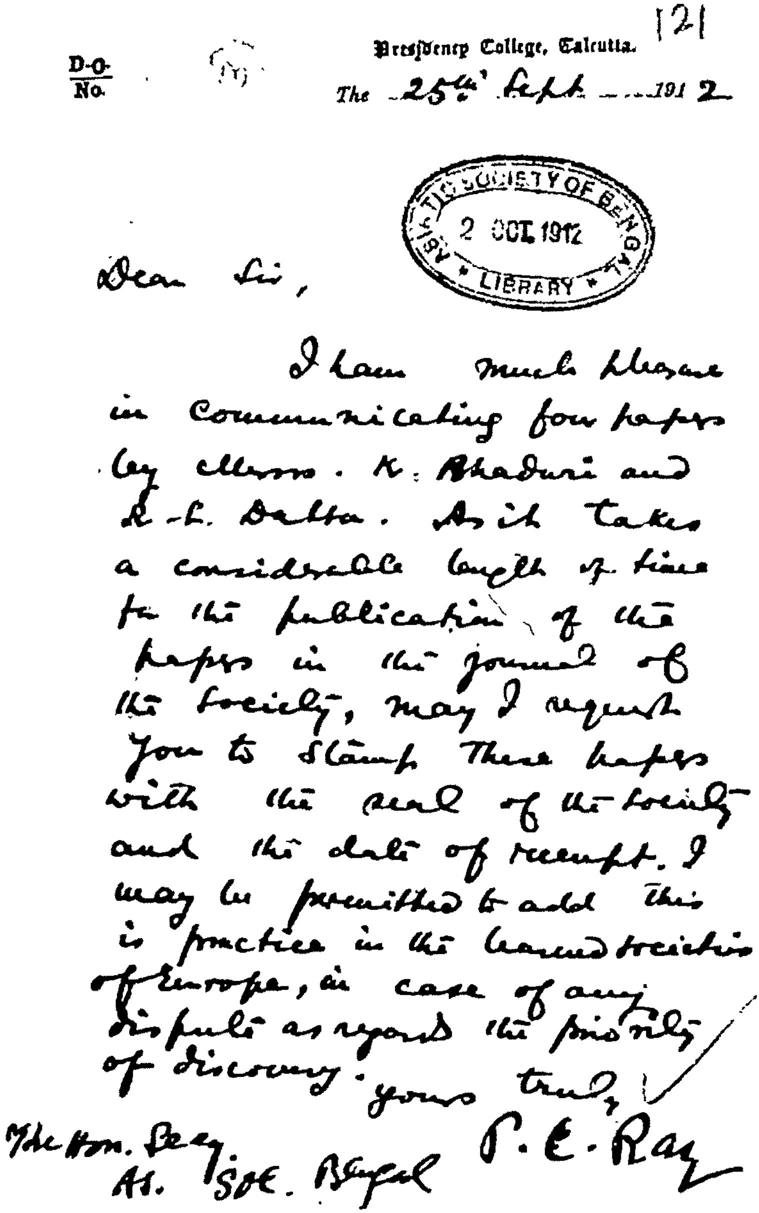
Yours sincerely
P. C. Ray



College of Scie.
Chemical Department
2-9-17.
146

Dear ~~Sir~~ Dr. Christie,

I have been unwell and almost confined to my bed. The paper on "Radiation Pressure" which was looked over by Dr. Meghnad Saha of our Physical Department is well-worth publishing in our Journal. The next meeting of the Society falls due during the Puza vacation, and we shall be all ~~as~~ out of Town.



121

D.O.
No.

Presidency College, Calcutta.
The 25th Sept 1912

Asiatic Society of Bengal
2 OCT 1912
Library

Dear Sir,

I have much pleasure in communicating four papers by Messrs. K. Bhaduri and R. L. Datta. As it takes a considerable length of time for the publication of the papers in the journal of the Society, may I request you to stamp these papers with the seal of the Society and the date of receipt. I may be permitted to add this is practice in the learned societies of Europe, in case of any dispute as regards the priority of discovery.

Yours truly,
P. C. Ray

The Hon. Secy
As. Soc. Bengal

3. R. L. De

(In addition to those with P.C. Ray.)

1. Relationship between the physical properties of isomeric cobaltamines and the electrovalencies of their coordination complexes. R. L. De. *Jour. Chem. Soc., 111, 51-56, 1917.*

4. B. B. Dey.

(In addition to those with H. K. Sen)

1. Action of Hydrazine Sulphate-upon Nitrites, and a new method for determining Nitrogen in Nitrites. B. B. Day and H. K.Sen. *Zeit. Anorg. Chem., 71, 236-242, 1911.*

2. Hydroximes of Benzil and Diacetyl. M. O. Forster and B. B. Dey. *Jour. Chem. Soc., 101, 2234-2240 1912.*

3. Condensation of Acetone dicarboxylic acid with phenols. B. B. Dey. *Proc. Chem. Soc., 29,154, 1913.*

4. Hydroximes of Methyl and Phenyl glyoxals. B. B. Dey. *Jour. Chem. Soc., 105,1039-1046 1914.*

5. Coumarin Condensations. IB. B. Dey. *Jour. Chem. Soc. 109. 1916.*

5. N. DHAR.

(In addition to those with P. C. Ray.)

1. Dissociation Constants of Monobasic acids. N. B. Dhar and A. K. Datta. Z. *Electro-Chem. 19, 407-409,1913.*

2. Distribution of some Electrolytes between water and a second solvent. N. R. Dhar and A. K. Datta. Z. *Electro-Chem., 19, 583-585, 1913.*

3. Inaccuracy of a Copper Voltameter. N. R. Dhar. Z. *Electro Chem. 19, 746-748,1913.*

4. Properties of the elements and periodic system. N. R. Dhar. Z. *Electro- Chem., 19, 911-913, 1913.*

5. The Electrolysis of Silver Nitrites and the transference number of the Nitrite ion. N. B. Dhar and D. N. Bhattacoharyya, *Zeit. Anorg. Chem. 82,141-144,1913.*

6. Conductivity of dilute solutions of some sodium salts in Ethyl

24. Halogenation, XIV. Bromination of Hydrocarbons by meansof Bromine and Nitric Acid. R.L. Datta and N.R. chatterjee. *Jour. Amer. Chem. Soc., 38, 2545–2552, 1916.*

25. Halogenatoin, XV. Direct Iodination of Hydro-carbons by means of Iodine and Nitric Acid. R.L. Datta and N.R. Chatterjee. *Jour. Amer. Chem. Soc., 39, 435–441, 1917.*

26. Halogenation, XVI. Iodination by means of Nitrogen Iodieor by means of Iodine in the presence of Ammonia. R. L. Datta and N. Prosad. *Jour. Amer. Chem. Soc., 39, 441–456, 1917.*

27. Neutral Potassium Persulphate as a reagent in Organic Chemistry. R.L. Datta and J.N. Sen, *Jour. Amer, Chem Soc., 39, 747–750, 1917.*

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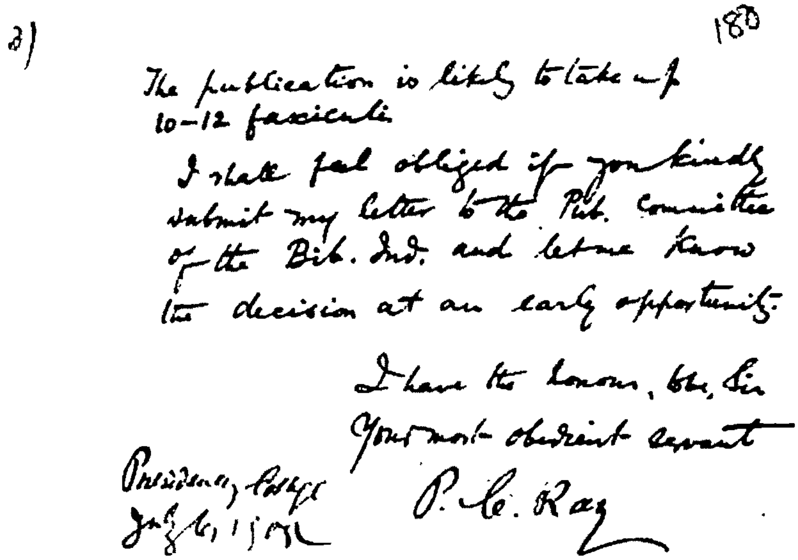

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The publication is likely to take up 10-12 fasciculi.

I shall feel obliged if you kindly submit my letter to the Pub. Committee of the Bib. Ind. and let me know the decision at an early opportunity.

I have the honour, etc., Sir
Your most obedient servant
P. C. Ray

Presidency College
Jany 6, 1902

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* We are indebted to the Asiatic Society authorities and staffs for these Copies– Editor. (pp. 323-353)
Source : Asiatic Society Library

1. From Acharya Ray to Shri J. N. Rakshit

C/o T. Cook & Sons
London
July 18, 1912

My Dear Jiten,

I have been incessantly occupied with the Congress affairs and I have also had to write everyday dozens of letters and hence I asked Nilratan to find you out and show you my letters to him. The Royal Society Celebrations have also come to a close and I am to sail from Marseilles next week on the 26th instant and expect to reach Calcutta on the 11th or 12th August next.

I have mixed intimately with many eminent chemists and have also visited their laboratoris. Sir Henry Roscoe has been taking a good deal of interest in me and the researches in Presy. Coll. Lab.

I hope you will on my return be in a position to devote yourself whole-heartedly to chemistry. I shall gladly make some arrangement for a fair monthly allowance so that you may not be troubled by anxieties. As I have often told you, go on making original researches and The *Arbeit* will be recognized in Germany and in a short time you will be able to secure a Ph.D. I have received all your letters. I am sorry Rasik has not done as well as he expected, but tell him not to lose heart; the research thesis he submitted will count for much. I am not writing to Nilratan separately; please tell him all about it. I have also received a letter from Sir A. T. Mookerjee about the Palit Chair of Chemistry. But I must take the advice of my friends and advanced pupils, before I finally make up my mind.

Yours sincerely,
P. C. Ray

P. S. You have done well in acknowledging on my behalf the congratulatory letters, etc.

2. From Acharya Ray to Shri J. N. Rakshit

March 7/16

My Dear Jiten,

Am delighted to learn that in your new communication on acid amides you have started a new conception of their constitution. Yes, I think an alkali metal is more likely to be linked to O. I am looking forward to the issue of the journal containing it. I do not know why you are so fretful over the college of science appts. Only the Professorships and the scholarships (of Rs. 75/- and Rs. 150/- each) have been filled up, but no Asst. Professorship or Demonstratorship—simply because no funds are available. In fact unless Government comes forward with a liberal grant, which I am afaid is not likely for the present, every thing will have to be postponed.

The post you have secured is a coveted one and I feel confident that if God grants you life and health you will in due course earn a reputation as the first Indian chemist authority on opium alkaloids. You know well that In India there is no public opinion worth the name of scientific subjects and hence the undue importance attached to a versity degree.

You are already worth a dozen or more M.Sc.s. Go on, persevere in your new field and utilize the unique opportunity presented and rest assured the world will not fail to appreciate you.

Yours sincerely,
P. C. Ray

3. From Acharya Ray to Shri J. N. Rakshit

April 6/20

My Dear Jiten,

Many thanks for your letter. I have of late been after so many things—going here, there and everywhere, delivering lectures on diverse subjecs and answering so many letters that I find my laboratory work has begun to suffer. It is impossible to reply to all criticism. Sir

M. Sadler writes to me appreciating my address and says that the Indianisation of service is absolutely necessary in the interest of the Indians. However, I shall by and by try to answer the criticism. You are perhaps reading in the papers of the congestion in the Passenger Traffic. I am afraid, it will be impossible to secure a berth before August.

Yours sincerely.
P. C. Ray

4. Form Professor F. G. Donnan to Acharya Ray

University of London, University College,
Gower Street, London, W.C.I.
2nd March, 1921

My Dear Sir P. C. Ray,

Very many thanks for your letter. I am glad to hear that you have arrived safely in India, and I hope you had a pleasant voyage.

I must thank you most heartily for the very valuable and welcome gift which you have made to me. The two volumes of your "History of Hindu Chemistry" have arrived safely, and they will form a very valuable addition to my library.

I was very interested to read the review from "Isis". The authro of the review seems to be a man of sense and intelligence. You quotation from Dumas' Faraday Lecture is likewise extremely interesting.

Since you left, your Indian Pupils and I have had several conferences on the subject of Applied Chemisry, and I have called in several experienced men to give them advice on the matter. I think they well be able to form a fairly good opinion of current ideas on this question in England. Nedless to say, these ideas may require some degree of suitable modification to adapt them to the particular necessities of the case in India.

I learn that Dr. Ghosh will sonn be leaving us here as he wishes to visit Germany and other places before going to take up his new post at Dacca University. I think Mr. Mukherjee will stay here till the end of June, when I think he will be able to complete his present work. Mr. Bhatnagar will also remain here till the summer.

I wish to tell you again what a very high opinion I have of your former students who are here. There is no doubt whatever that you have, by your constant devotion to teaching and research, created a school of chemistry in India which will be of the greatest importance for the prosperity of that land. I feel certain that you have done work in India of which any man might feel proud in any country, and I offer you again my heartiest congratulations.

There is no doubt that when these troublesome political questions settle themselves, as they are bound to do in time, a future of great prosperity awaits India. This prosperity will depend on many factors, such as the health and happiness of the people, and their suitable adaptation to industrial conditions. But granted that the social and political conditions are healthy and progressive, the fundamental factor of progress will depend on the unceasing progress of pure science and its unceasing application to the building up of human welfare. I regard you as a pioneer in this matter, as well as in the question of the reform of social conditions, and I think that in ages to come your name will be remembered and honured as one of the great and most modest pioneers of Indian intellectual social, and industrial Renaissance. I am not saying these words any desire to flatter you, but simply to express the opinion of those who know of the work which you have done and continue to do.

Please accept my very best wishes for your continued health and happiness.

Yours faithfully,
F. G Donnan

P.S. My mother and sisters desire also to send you their very best regards and wishes.

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* All these letters (1-4) are reprinted from Acharya Prafulla Chandra Ray–Birth Centenary Souvenir volume, Calcutta University 1962.

5. Acharya Ray To Dr. J. N. Mukherjee

University College of Science &
Technology
92, Upper Circular Road, Calcutta,
The 20th April, 1921.

My Dear Jiten,

তোমার ২৪শে মার্চ্চ তারিখের পত্র যথাসময়ে পাইয়াছি। 'বড়' জ্ঞানকে লইয়া স্যর আশুতোষ তোলপাড় করিতেছেন—breach of faith, contract, ethical principles, etc. গত শনিবার Governing Body-র মিটিং-এ আমার সহিত exchange of high words হইয়াছে। কারণ, তিনি আমাকে মূলীভূত কারণ ধরেন। আমি বলিলাম, "I stand in the *loco parentis.* আমার ছেলেদের উন্নতির পথে কাঁটা দিতে পারি না। সর্ত্তে আছে যে College of Science join করিতে না পারিলে টাকা ফিরাইয়া দিতে হইবে। আমাদের Univ. একপ্রকার দেউলিয়া—তাহাদের সামান্য বেতন দিয়া আটকাইয়া রাখা ন্যায়গর্হিত etc.?" অর্থাৎ Dr. Seal চলিয়া গিয়াছেন। রমেশ মজুমদার, হরিদাস ভট্টাচার্য্য, সত্যেন প্রভৃতি ঢাকায় যাইতেছেন। আবার রাধাকমল ১০০০—১২০০্ বেতনে বম্বে Univ.-এতে যাইতেছেন। ইহাদিগকে ধর্‌তে-ছুঁতে পারেন না; কেবল জ্ঞানদ্বয় ও মেঘনাদকে moral obligation ও ethics-এর দোহাই দিয়া আটক করিতে চান। তোমরা যে College of Science-এর Staff-এ রহিয়াছ আর on deputation leave, অতএব অনুমতি ব্যতিরেকে যেতে পারে না। Lord Ronaldshay-কে সমস্ত file দেখাইয়া বুঝাইতেছেন। তোমার উপরও দেখিলাম খাপ্পা। যাহা হউক, কিছুমাত্র বিচলিত হইও না। দরকার যদি হয় আমি Lord Ronaldshay-এর সহিত সাক্ষাৎ করিয়া বড় জ্ঞানের বিষয় বলিব। Technological-এর বিষয় সমস্তই পণ্ড হইয়া যাইতেছে। এন কি হেমেন্দ্রও একটি ক্ষুদ্রাকার workship করিবার সামান্য টাকা পাইতেছে না। অর্থাৎ তহবিলের সমস্ত টাকা অন্যান্য নানা ভূতের বাপের শ্রাদ্ধে ব্যয়িত হইয়াছে। ফল কথা, আশুবাবুর সহিত বনিবনাও হইয়া চলা অসাধ্য হইয়া উঠিতেছে। আমার বোধ হয় ক্রমে ক্রমে open revolt দরকার হইবে।

আমি পরশু দিন সন্তোষ (টাঙ্গাইল) জাহ্নবী H. E. School-এর Jubilee উপলক্ষে যাইব। সেখান হইতে ফিরিয়াই আন্দুল যাইব। তাহার পর ২রা মে বাগেরহাট হইয়া দেশে summer vacation উপলক্ষে রওনা হইবে।

এইমাত্র মেঘনাদ ও জ্ঞানের নিকট হইতে Berlin Wullenweber Strasse bei Herrn Schmidt এই ঠিকানায় Mar. 25 ও 22 তারিখের দুইখানা চিঠি পাইলাম। আমিও যে চিঠিখানি enclose করিতেছি তাহা পাঠ করিয়া এবং তোমাকে যে পত্র লিখিলাম তাহাও তাঁহাদের নিকট পাঠাইব। লণ্ডন হইতে বার্লিন বোধ হয় দুই দিনে গিয়ে পৌঁছিবে। আর যে অমৃতবাজার ও সঞ্জীবনী পাঠাইতেছি তাহাও মেঘনাদকে পাঠাইবে।

Yours sincerely.
P. C. Ray

6. From Acharya Ray to J. C. Ghose and M. N. Saha

University College Of Science &
Technology
Department Of Chemistry.
21. 4. 21. 12. a. m.

স্নেহভাজন জ্ঞান ও মেঘনাদ,

এইমাত্র তোমাদের ২২শে ও ২৫শে মার্চ্চ তারিখের পত্র পাইলাম। ইহার পূর্ব্বে মেঘনাদের (direct) ও কানাই-এর মারফত পত্রে সবিশেষ অবগত হইয়া তোমার (মেঘনাদের) কথামত ২১নং ক্রমওয়েল রোডের ঠিকানায় উত্তর দিয়াছি। Einstein, Laue, Planck ও Nernst ইঁহারা প্রত্যেকেই নিজ নিজ বিষয়ে এতো অসাধারণত্ব দেখাইয়াছেন যে ইঁহাদের Nobel Laureate বলিলে বিশেষ খাতির করা হয়না। ইঁহারা "বড়" জ্ঞানের *bahnbrechende Werke* সম্বন্ধে যে অভিমত প্রকাশ করিয়াছেন তা জানিয়া আমি হর্ষোৎফুল্ল হইয়াছি। আমার জীবনে আমি এ রকম বিমল সুখ কখনো সম্ভোগ করিতে পারি নাই। আমি "ছোট' জ্ঞানের Electrical Conception of Colloids বিষয়ক Faraday Soc. reprint -এর জন্য অপেক্ষা করিতেছি।

বাস্তবিক, বিলাতে Royal Soc. বিষয়ে তুমি যাহা লিখিয়াছ তাহা literally true. এমন কি, নীলরতনের মতো ঠাণ্ডা মেজাজের লোক এবারকার election সম্বন্ধে লিখিয়াছেন যে ইহারা "হারামজ্জাদা"।

তোমরা তিনজনই যে দেশের মুখোজ্জ্বল করিতেছ তাহা কেবল নীরব সাধনার

ফল— এখন আর ফাঁকা আওয়াজ ও হৈ-চৈ করার প্রয়োজন নাই। যে 'অমৃতবাজার' যাইতেছে তাহাতে Watson বিষয়ক কিছু আছে। বলা বাহুল্য ইহা কাহার দ্বারা inspired, "ছোট" জ্ঞানের পত্রে সমুদয় অবগত হইতে পারিবে।

আমার মত এই যে তোমরা উভয়েই বার্লিনে কিছুকাল অবস্থিতি কর। এ প্রকার মনীষীগণের সংস্পর্শে আর জীবনে কখনো আসিতে পারিবে না। বাস্তবিক, দু-একজন বাদ দিলে ইংলণ্ডে সকলেই mediocre. আমরা Subject race এই মনে করিয়া বোধ করি তাহারা আমাদের কাজ মন খুলিয়া appreciate করিতে পারে না। গুণী গুণিনং বেত্তি। "গলাভালা" ভিন্ন মন খুলিয়া প্রশংসা করা বিলাতি বৈজ্ঞানিকের অসম্ভব।

Registrar এই মেলে তোমাকে একখানি Calendar পাঠাইবেন। তাহাতে College of Science- এর অধ্যাপক নিয়োগ সম্বন্ধে সমস্তই আছে। এ সপ্তাহের 'সঞ্জীবনী' ও একখানি পাঠাইলাম। অত্রত্য মঙ্গল।

জ্ঞানের একবার Sweden যাইয়া বক্তৃতা দিতে পারিলে বড়ই ভাল হয়; বিশেষতঃ Arrhenius এই নূতন theory ভাল করিয়া হজম করিতে পারেন নাই। এ কল্পনা আশা করি কার্য্যে পরিণত হইবে। আজ এই পর্য্যন্ত; স্নান-আহারের সময় উপস্থিত।

আঃ শ্রীপ্রফুল্লচন্দ্র রায়।

7. From Acharya Ray to Dr M. N. Saha

আর. কে. বি. কে হরিশচন্দ্র
ইনষ্টিটিউসন্
পোঃ আঃ রাড়ুলি
জেলা খুলনা
তারিখ, 24th May, 1921.

My dear Meghnad,

তোমার ১৬ই এপ্রিল তারিখের পত্রে সমস্ত অবগত হইলাম। তুমি নানা স্থান বেড়াইয়া অভিজ্ঞতা ও বহুদর্শিতা লাভ করিয়া এমন কি Germany-র সুধীবর্গের সহিত মিলিয়া মিশিয়া যে লিখিতেছ, "বৃদ্ধবয়স পর্য্যন্ত এক মনে এক ধ্যানে বিজ্ঞান ও দেশের সেবা কর্ত্তে পারে এরূপ লোকের সংখ্যা ইউরোপেও কম", ইহা পড়িয়া

একটু আশ্চর্য্য হইলাম। I am now three scores years old, কিন্তু laboratory-তে এখনও ছয় সাত ঘণ্টা কাজ করিতে না পারিলে মনে হয় দিনটা বৃথা গেল।

তোমার ও জ্ঞান প্রভৃতির কার্য্যকলাপের দ্বারা একটি মোহ যাহাতে ঘুচিতে পারে তাহার শীঘ্রই চেষ্টা করিব। অর্থাৎ বিলাতী মাটি স্পর্শ না করিলেও একটি বিলাতি degree "good, bad or indifferent" লইয়া আমাদের দেশের লোকের চোখে ধূলি নিক্ষেপ করার রীতি উঠাইয়া দিবার সংকল্প করিব। দুঃখের বিষয় আশুবাবুর মত লোকও এই মোহাচ্ছন্ন।

ইতিপূর্ব্বে তোমাকে জানাইয়াছি যে আমি গত দেড় মাস ধরিয়া গোবরডাঙ্গা, নওগাঁ, গাইবান্ধা, সন্তোষ, টাঙ্গাইল, আন্দুল, বাগেরহাট অঞ্চল অনেক ঘুরিয়াছি। সর্ব্বত্রই ছাত্র ও শিক্ষকবৃন্দের আহ্বান। অনেক স্থলে এক এক বক্তৃতায় দুই তিন হাজার লোককে address করিয়াছি। টাঙ্গাইলে সাহা community প্রায় শতবর্ষ ধরিয়া ব্যবসায় শ্রীবৃদ্ধিলাভ করিয়াছেন। কেহ কেহ অনেক ব্যয়ে বিদ্যালয়ের প্রতিষ্ঠা করিয়াছেন।

এবার আমাদের এ-অঞ্চলে অজন্মা হেতু একপ্রকার দুর্ভিক্ষ হইয়াছে। লোকের কষ্টের সীমা নাই। আমরা relief organization লইয়া ব্যস্ত।

জ্ঞানের পত্র পাইয়াছি। তাহাতে জানিলাম যে বিলাতে strike নিবন্ধন যে জাহাজে রওনা হইবার কথা ছিল তাহার পরের ষ্টীমারে আসিবেন। জ্ঞানের appointment নিয়ে আশু বাবুর বিদ্বেষমূলক কীর্ত্তির বা অপকীর্ত্তির কথা পূর্ব্বেই জানিয়াছ। তিনি ভাংচি দেওয়ার চেষ্টায় আছেন। অর্থাৎ ৩০০্ বেতনে আজন্ম দাসখত লিখিয়া College of Science -এ থাকিতে হইবে।

অত্রত্য মঙ্গল।

Yours sincerely,
P. C. Ray.

8. From Shri Jogendra Nath Basu to Acharya Ray

10 & 11, Rowland Road, Calcutta,
(Elgin Road, P. O)
৭ ভাদ্র, ১৩৩১ সাল

বিনীত নিবেদন,

আপনার স্নেহপূর্ণ পত্র পেয়ে যে কি পর্য্যন্ত আহ্লাদিত হয়েছি তাহা পত্রে কেন,

উক্তির দ্বারাও, পূর্ণভাবে প্রকাশ করিতে অক্ষম। আমার কুটীরে যে আপনি পদার্পণ করিয়াছিলেন, ও কয়দিন মুষ্টিমেয় আহারে নামের মত সদা প্রফুল্ল ছিলেন, তাহাতে আমার বাটী কেন, বাটীর কর্ত্তা ও গৃহিণী ও অন্যান্য পরিবারবর্গ সকলেই বিশেষরূপে সম্মানিত হইয়াছে, এবং আপনার ন্যায় মনীষীর সাদাসিধা নির্গর্ব কথোপকথেনে ও চালচলনে আমাদের একটা অনুকরণের আদর্শ হয়েছে। কিন্তু চিরজীবন বৈষয়িক সুখে উন্মত্ত থাকায় এখন খোলস বদলান অসম্ভব, সেইজন্য বিদ্যার উৎকর্ষতা দূরে থাক্, মনের উন্নতি আপনার মত করা বিশেষ অসম্ভব বলে মনে করি।

আপনার খাটুনি বেশ বুঝতে পারি, সে কেবল বিশাল বক্ষঃ সূক্ষ্ম শরীর বলেই সম্ভবপর হয়েছে। ইতিমধ্যে কাগজে আবার অনেক চিঠিপত্র পড়্‌ছি, তা ও প্রকার খোঁচা আপনাকে কোনরূপ বিচলিত করতে পারে না, ইহাই আমার বিশ্বাস।

আপনার কটকের বক্তৃতা ধারাবাহিক মতে বসুমতীতে বাহির হইতেছে তাহা বিশেষরূপে পড়িলাম। ও সেদিন টাউন হলে ও মাঠেও আপনার মায় ছাতি মূর্ত্তিও দেখলুম, তবে বেশী যে বক্তৃতা করেন নাই, তাহার জন্য আপনাকে বিশেষ ধন্যবাদ দিতেছি, কারণ ব্যাঘ্রের মত গর্জ্জন না করলে ওখানে সহজ চীৎকার শ্রুতিগোচর হওয়া অসম্ভব।

আর আমাদের গভর্ণরের কথা কি বলিব, ইংরাজের মনের ভাবটা তিনি খুলেই বলেছেন, এবং অনেক হ্যাটকোট বা শামলাধারী লোক তাহা যে যুক্তির দ্বারা সমর্থন করিতে প্রয়াস পান, তাহাতে আমাদের এই চাটুকার জাতির প্রতি শ্রদ্ধা বড়ই কমিতে থাকে। বাল্যবিবাহের জন্য অর্থাভাব ও অলসতায় আমরা বিবেক পদার্থটাকে সমূলে নষ্ট করিয়া আত্মসম্মান হারাইয়াছি, এমন কি মা ভগ্নীকে অকথ্য গালি দিলেও সাবেহমুখপ্রসূ বলিয়া তাহাকে আশীর্ব্বাদ বলে ধরে থাকি।

দিলীপ বড়ই জ্বরে ভুগেছিল, তাহাকে দুদিন দেখতে গেছ্‌লুম, আপনার কাছেও তদ্রূপ কিন্তু আপনি তখন পূর্ব্ববঙ্গে।

অনেক বড় আবল তাবল বক্‌লুম। ধৃষ্টতা মাপ করবেন। আগত সোমবার কটক যাব। এ বৎসর উড়িষ্যায় জল নাই, দুর্ভিক্ষ অবশ্যম্ভাবী।

বিনীত

শ্রীযোগেন্দ্র নাথ বসু

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* এসব চিঠিপত্রগুলি Acharya Prafulla Chandra Ray–Birth Centenary Souvenir Volume, C.U. 1962 থেকে নেওয়া—Editor.

9. From Dr. B. N. Seal to Acharya Ray

Vice-Chancellor's Residence
Mysore
12th September, 1926.

* Double-Entendre :—
Charaka + Rishi
and
Charaka +̧ Rishi

My Dear Charakarshi *

My most grateful thanks are due to you for the copy of the Address to the Teacher's Conference, which bears throughout the stamp and impress of a great soul in travail.

But as you are aware, gratitude is, in essence. 'a lively anticipation of favours to come', and even if this is questioned. the expression of gratitude is unquestionably such.

By sending me therefore a copy of the Address, you have laid me under an obligation to ask for a greater 'favour to come'. I believe the Mysore Government will request you to deliver the Convocation Address to this University in November next (11th November). If this request comes, please do not refuse. If will be a great disappointment to the people of Mysore and the members of the University if you should refuse. We are all anxious to have the great Acharya in our midst.

This is the greater favour to which I began referring.

Trusting this trip to England has improved your health.

Yours affectionately,
Brojendranath Seal.

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10. From Dr. B. N. Seal to Acharya Roy

Mysore
10th October, 1926,

My Dear Acharya Sahib,

Your letter made me very glad. So you are coming, and I shall have you with me for some days.

You will be the honoured guest of the Mysore Government, during your stay here.

The Registrar will make the official communication.

You are not only a Rishi of the test tube, and of the Charka;—but like Charaka himself you are also a man of letters.

The Convocation comes off on the 27th November, there is just a month and a half.

Every body is glad ('rejoices' is the word) that you are coming.

Let me know when you are leaving Calcutta. You must be here before the 24th, I mean, before the date fixed for the meeting of the Council of the Indian Institute.

Yours sincerely,
Brojendranath Seal.

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13. From Acharya Ray to Dr. S. S. Bhatnagar

2-12-1935

My dear S. S

I have long taken practical leave of the latest developments of chemistry and physics. It is only by occasional conversation with my colleagues in the Inorganic Chemistry Department, namely. Priyadaranjan and Pulin Behari, that I try to keep meself informed of the outlines of the up-to-date developments, for instance, the transmutation of the lighter atoms, e.g, B, Si, Al, etc. by Curie-Joliot. During the last 7 or 8 years. I have even ceased to glance through "Nature" except very rarely. In the "Nature" of October 12, of this year there is a readable and suggestive article by Prof. Armstrong, which occupies the place of honour—namely, "Food, Farmer and Future"; my attention was drawn to it by a chemist of the biochemical department of Bengal Chemical. On turning over the pages my eyes chanced across an advertisement of MacMillan's in which I find your book at last advertised. Of course, I have neither the time nor the capacity to judge the merits of the work; but I take for granted that in it your own researches occupy a prominent place and as such it is not a mere compilation. That the book is of a high standard is indicated by the recent excellent review in "Current Science" by one who is competent to judge.

As far as I know Meghnad's is the only textbook in physical science which has been adopted by foreign Universities; and it gladdens my heart that another work in physical science is likely to occupy a similar place.

My days are practically numbered, and it is a great consolation that you in Chemistry are trying to raise the reputation of the Indian workers abroad.

Yours sincerely,
P. C. Ray

14. From Acharya Ray to Dr S. S. Bhatnegar

University College of Science and
Technology
Department of Chemistry,
92, Upper Circular Road.
Calcutta, 12-12-1935.

My Dear S. S.,

Very glad to receive your letter and also your book. Needless to say, after Priyada has reviewed it in our journal I shall make a present of it to the library of the Chemical Society. Of couse, MacMillan's printing leaves nothing to be desired. But that is not the point. What gladdens me is that you have associated so many of your pupils in this field, nay there are two Bengalis in your laboratory working under you. I find that you have done full justice to D. M. Bose's contributions and have devoted a special section to Priyadaranjan's.

One feature of your character comes out prominent, namely, that you are unstinted in your acknowledgement of the contribution of the

Indian workers—a feature which is unfortunately wanting in some researchers.

I am not at all surprised at your complaint of the jealousy betrayed by some of your friends. It is a characteristic feature of Indians—and I may add, of orientals—that they want to drag down those who have acquired some sort of eminence to their own level—whereas in Europe, it is generally the custom to carefully study the ways by which one acquired eminence and try to emulate it. But pray, don't be bothered by such pettiness. Any good work done carries its own reward and even recognition—though it may be sometimes belated. The way in which you are associating and inspiring a band of young workers extorts our admiratoin. A better and more patriotic use could not have been made of the money which you have earned from the oil company and which you have made over to the University for research purposes.

You hint at my provincialism, but underneath it there is a bitter cry over the indolence and lack of enterprise of every class of the Bengali. For instance, I am writing in Bngali a small book pointing out the failure of the Bengalis in every branch of trade, commerce and business in general. For example, I am illustrating it by referring to the fact that in Lahore, at the Mall which is something like the Chowringhee of Calcutta, practically all the houses and business are owned and managed by the Punjabis themselves. Similarly at Anarkali, which is something like our Burrabazar, the Marwaris are simply conspicuous by their absence, whereas in Calcutta in Burrabazar the Marwaris and Bhatias (Guzrati) have monopolized all the import and export business. In Calcutta again, all the bus and taxi drivers are Sikhs and some of the big railway contractors in the E.B. Line are Punjabis. I instance these not out of jealousy but to draw pointed attention of Bengali's ineptitude. For instance, I am writing a short sketch of the career of Seth Ghanashyamdas Birla—how he began at 17 in Calcutta. He is now only 41. Within this quarter of a century he, in fact (jointly as Birla Bros.), has built up a magnificent business embracing various branches, e.g., jute mill, cotton mill, hessian and siler deals, You know also that the Birla Brothers have donated altogether six lacs to the Hindu University and their charities in various other directions are unbounded. If I allude to the Marwaris and Bhatias, it is not to excite jealousy but to open the eye of the Bengalis. One or two more instances will suffice. According to the latet census report drawn up by Hutton, by money order alone some six crores are annually remitted from Bengal by the labourer classes, chiefly Beharis. In my "Life and Experiences" I have pointed out that to the district town of Saran every year a crore of rupees is remited by money orders; and this is also borne out by the census report. Our cooks and household servants are almost entirely recruited from Orissa, Behar and U.P., showing that we ourselves have to engage them because corresponding classes of the Bengalis are idle and incapable. Twelve crores we have to remit to the Bombay and Ahmedabad millowners and core than two crores to the insurance companies there. I have given in my book an estimate of ten crores per month, i.e., 120 crores per year—drained away by the non-Bengalis excluding Europeans—from unhappy Bengal.

I have, repeatedly, to point out these out of agony but not out of jealousy. If a Bengali often domiciled, were to get a Government job worth 50 or 100 rupees, a hue and cry is raised by the Oriyas and Beharis though the economic conquest of Bengal is alost complete by these very people.

I hope you will now understand my position.

Yours sincerely,
P. C. Ray

15. From Acharya Ray to Mr. W. C. Wordsworth

(1936)

Dear Mr. Wordsworth,

I think you remember that a year or more ago a communally-minded Moslem brought a resolution in the Bengal Council to the effect that as the Moslems form the majority of the population of

Bengal they should have proper representation in the Senate and Syndicate of the Calcutta University. Syamaprasad Mookrejee no doubt gave a crushing reply; but your speech was the *speech* on the occasion. Being neither a Hindu nor a Moslem and with your vast experience in the educational line you could speak with commanding authority. Incidentally, you said some funny things, namely, that the Scotch people are swamping the government both at 'Home' and also here in the Legislative Council, etc. Not only was the Prime Minister a Scotsman, but even several members of the local Government hailed from Caledonia. The enclosed extract from Bernard Shaw also re-echoes what you said. Now Bernard Shaw is regarded as perhaps the greatest of the living writers—he is certainly a great mind. And as you think alike with him, *ergo,* you are a great mind!

Now to come to the point. The above only are aside. The other day at the 'At Home' given to Sir Richard Gregory (at MacMillan's) at which you were present, Mr. and Mrs. Stapletontold me that they were both enjoying my book. Fermor (Geological Survey) and Wolfenden also told me the same Yesterday, the Italian Consul called on me and incidentally said that he was reading my book right through. Sir Daniel Hamilton also told me the same.

I enclose a synopsis of some of the selected opinions on the book. The 'Madras Mail' though it takes care to point out that 'it does not see eye to eye with the author' is eloquent in its appreciation of my humble work. But how it is that the 'Statesman' maintains discrete silence? Perhaps it thinks that it will have to say some very hard things. But something is better than nothing. 'Paint me as I am', said the great Protector to Leby the painter, 'if you leave out the scars and carbuncles, I shall not pay you a farthing.' So let the blemishes as also the redeeming features, if any, be pointed out and the golden silence broken!

Yours sincerely,
P. C. Ray

W. C. Wordsworth Esq. M.A.
Statesman Office
5 & 6 Chowringhee Road
Calcutta

16. Extracts from a letter of Acharya Ray written to a Colleague in B.C.P.W.

(1940)

When I founded the B.C.P.W. I had not only the idea of wiping out the reproach that the Bengaless were good for nothing in business affairs, but also of making it a model institution. The Bengal Chemical has not been to me a mere dividend-earning machine—though certainly it is an important thing—but also of showing how amicable relations can be maintained between capitalism and labour. I again repeat that our servants, from ill-paid officers to the labourers, by no means enjoy an enviable lot. We are paying one month's salary after 10 years' service, and a half a month's salary after 5 years. But the other day at the Bengal Potteries Mr. Bhagat and the Directors agreed that one month's salary should be given as bonus after 5 yeras' service and half a month's salary should be given as bonus after 5 years' service and half a month's after 3 years, and so on, and this includes not only the officers but also the labourers and coolies. It is to be remembered that the Potteries under the *new* management is only three years old and has not yet given any dividend.

Last week, I was invited by the Batas to visit their works. I wos surprised to find neatness and cleanliness pervading everywhere. Every worker looked cheerful and contented and even the meanest draws Rs. 5/4/- per week and then upwards from Rs. 8/- to Rs. 10/-, and Rs. 10/- to Rs. 15/- and so on, and the foremen and supervisors get as much as Rs. 100/-, Rs. 150/- and Rs. 250/-. The labourers' quarters are a marvel to visitors.

As I have repeatedly told you Morris (now Lord Nuffield), Austin, Cadbury and several others have done wonderful things for the uplift of the workers, but the dividend-mania and the screwing endeavour of the Directors have given the lie to my lifelong cherished ideal.

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* These letters (9-16) are being reprinted from Birth Centenary Souvenir Volume– A.P.C. Ray, C.U. (1962)

'As I conclude my eyes are turned to my Yarvada goad—inside the iron bars of which lies encased the mortal frame of the patriot—Saint of modern India the purest and noblest soul that ever drew breath he who throught and preached and lived on the gospel of India's Salvation."

'3rd August 1926

'Application of Nikunja Behary Mukherjee, BSc., is entitled to most serions consideration. For the last quarter of a century or more I have been watching the careers of those who have been deputed in Europoe or America to learn new branches of industry or advanced method in the same. I am sorry to say that I have been filled with pessism; the several indegenous industries which have been started in Bengal, owe their initiative mainly to those who have near been abroad. The scholars who have been sent abroad have seldome been able to give satisfactory accounts of themselves; in fact immediately on their return from abroad they wait in the antichambers of the heads of departments seeking for a "soft Job", on assured pay.

In my opinion the cause of industry will gain more if instead of swelling the numbers of scholars we render help to those who have already shown initiative and resourrcrefulness and gained a footing in some particular industry in the teeth of enormons initial difficulties.

One reason, why industrial scholars returned from abroad are found to be helplessly at sea in that in Europe or America industry in generally conducted now-a-days on a colloa scale, and hey tail to accommodate their experience to local condition. I therefore take the liberty to suggest that instead of sending a brand new man to learn the method of match manufacturing abroad if Nikunja Behary Mukherjee, BSc., be helped with an aid from the department to start a demonstration factory in Bengal and train apprentices here the cause of match manufacturing will be better served.

(Sd) P. C. Ray

(Sir. P.C. Ray, D.Sc, PhD, CIE etc. etc.)

ঝিকর গাছা কনফারেন্সে এ যাওয়ার সময় ট্রেনে আচার্যদেবের সঙ্গে আমার প্রথম আলাপ হয়। তিনি স্বতোপ্রণোদিত হয়ে আমাকে বলেছিলেন,—কখনও সুযোগ হলে বিজ্ঞান কলেজে আমার সঙ্গে দেখা করো। তোমাকে যথাসাধ্য সাহায্য করতে চেষ্টা করবো।’

১৯২৬ সালের আগষ্ট মাসে বেঙ্গল গর্ভনমেন্টের শিল্প বিভাগ বিদেশে দেশলাই তৈরীর পদ্ধতি শিখবার জন্য বার্ষিক ২৪০ পাউন্ড হিসেবে দু বছরের একটি কারিগরী বৃত্তি মঞ্জুর করেন। বিজ্ঞাপনে জানানো হয়।

‘...Are you a match making expert or a match manufacturing expert?’

নিকুঞ্জবিহারী মুখোপাধ্যায়-এর লেখা থেকে এটি সংগৃহীত—‘আচার্য স্মৃতি’ বই থেকে নেওয়া। তাঁর ছাত্রজীবনে ‘match expert’ বলে সাক্ষাৎপ্রার্থী হয়েছিলেন—আচার্য প্রফুল্লচন্দ্রের।—সম্পাদক।

Senate House,
Calcutta.
The 25th June, 1912.

My Dear Dr. Ray,

It may be in your recollection that on the 24th February last, when the question of the establishment of University Professorships was before the Senate you expressed your regred that no provision was made for a Chair of Science. I assured you, on the spur of the moment, that a Chair of Science might come sooner than you expected. You will be pleased to hear that my prophecy has been literally fulfilled and that what was your ambition and my ambition has been realised We have founded two Professorships, one of Chemistry, the other of Physics. We have also decided to establish-at once a University Research Laboratory. All this we are able to do by reason of the munificence of Mr.Palit, supplemented by a grant of two and a half lacs from our Reserve Fund The whole position is explained in thes tatement I made before the Senate last Saturday; a copy is enclosed herewith. I have now great pleasure in inviting you to be the first University Professor of Chemistry, and I feel confident that you will accept my offer. I need hardly add that I shall arrange matters in such a way that you be not a loser from a pecuniary point of view. AS soon

as you return, we shall, with your assistance, prepare plans for the proposed laboratory, and being to build as early and as quickly as practicable. It would be an advantage, if before your return, you could make time to see some of the best laboratories in Great Britain or on the Continent.

I was delighted to find that you had been made a C.I.E. but I feel that it might have come ten years earlier.

I hope you are quite well and have profited by your visit to England.

Yours sincerely,
Ashutosh Mookherjee.

Published in 'Life & Experiences of a Bengali Chemist' Vol-I, pp.179-180.

My Dear Sister,

I am so much choked up with feelings that I can scarely give vent to them. Ever since his historic defence of Aurobindo Ghosh, which will always rank as one of the classics in the State trials, your husband has loomed large before the public. His unbounded charity, his lofty patriotism, his high idealism, his heroic and chivalrous defence of the weak have always evoked our admiration. Although I do not see eye to eye with him in some matters, I have always felt attracted to him, and I do not at all wonder that his striking personality should capture the imagination of Bengal, or for the matter of that of Young India. Even those who differ from him in political matters cannot withhold their admiration for the unparalleled self-sacrifice he has made. Our hearts go out to Chittaranjan in the hour of his trail. I know the limitations of the expert, and from my position of isolation and detachment, I am afraid, I fail to realise the full significance of his life's missom. Has not the poet said?

"The man of science is fond of glory and vain
An eye well practised in nature but a spirit bounded and poor."

Possibliy, exclusive, lifelong devotion to my favourite subject has blurred my vision and my *spirit* has become circumscribed. I can assure you, however, dear sister, that in serving my favourite science

I have only one idea in my mind, namely, that through her I should serve my country. Our aspirations are the same. God knows, I have no other object in my life.

Cheerfully and heroically you have been bearing your tribulations, and have set an example to modern Bengal and womanhood, which has been rarely met with since the days of Rajput glory.

I sincerely hope that the dark clouds which have over-shadowed our dear Motherland will soon be dispelled and you husband restored to us.

Yours sincerely,
14.12.21. P. C. Ray."

A letter dt. 14 dec, 1921 written to C R. Das's wife Basanti Devi on the occasion of the incareeration of Mr. C. R. Das from his autobigraphy Life & Experiences of a Bengali Chemist-vol. p. 232=233. (Asiatic Society)—Editor

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92, Upper Circular Road,
Calcutta (India).
October 23, 1924

"Dear Prof. Wynne,

I thank you very much for your telegram dated the 17th October, 1924. I need scarecly assure you how highly we value the congratulations and warm wishes of yourself and the Council of the Chemical Society, which we shall always look upon as the parent Society. The J.C.S. has hitherto been the only organ of chemists throughout the British Empire, and the Publication Committee have been hard put to it to find space for the ever-increasing number of comunications and have often been under the necessity of appealing to authors of papers to abridge them as far as possible. This will explain the necessity of founding the India Chemical Soceity, with an organ of its own.

More than 40 years ago, while a student a Edinburg, I almost dreamt a dream that, God willing, a time would come when modern India would also be in a position to contribute her quota to the world's stock of scientific knowledge, and it has been my good fortune to see my dream materialise. I have shown in my *History of Hindu Chem-*

istry that this branch of science was zealously pursued in ancient India and I have now the satisfaction of finding chairs of Chemistry in most of the Universities of India filled by my own pupils, who have also been regular contributors to the J.C.S.

It will always be our endeavour to maintain cordial, nay filial, relationship with the parent society, whose inspiration we shall always highly prize. I can scarely suppress the feelings which arise in me as I am penning these lines. My mind naturally travels back to the memorable February 23, 1841, when the original members met for the purpose of taking into consideration the formation of the London Chemical Soceity. I have, further, the gratification to remember that of the original members of the London Chemical Society, I had the good fortune of knowing Lord Playfair (who represented Edinburgh University for some time) to whom I was introduced by my revered teacher, Crum Brown.

Thanking you once more for you good wishes,

Yours etc.,
(Sd.) P. C. Ray."

Vide proceedings of the Chemical Society (London), dated November 20, 1924.

From the Life & Experiences of a Bengali chemist-Vol.I. pp.194-195. (Asiatic Society)

London Chemical Society
Burlington House
London W.I.
11 February, 1915

Dear Sir Prafulla Ray,

The Council of the London Chemical Soceity has noted with much pleasure that His Majesty has been pleased to confer the honouir of Knighthood on you and has requested me to offer you its heartly congratulations on this well-merited mark of distinction.

Yours sincerely,
W. J. Popo
President

লন্ডনের Royal Chemical & Society-র সভাপতির চিঠি P.C Ray-কে মণি বাগচির আচার্য প্রফুল্লচন্দ্র বই থেকে সংগৃহীত।—সম্পাদক।

VIDYASAGAR COLLEGE MAGAZINE
December. 1933.

A MESSAGE
FROM
ACHARYA PRAFULLA CHANDRA RAY

As an old boy of the Metropolitan Institution (now named Vidyasagar College), I have great pleasure in offering to this great and glorious institution associated with the hallowed memory of Pandit Iswar Chunder Vidyasagar, a message of hope and progress. I sincerely wise all prosperity to the thousands of students and to the professoriate of the College, who have built up a reputation which is next to none in the eoucational world of India.

P. C. Ray

(we are indebted to the Vidyasagar College authority and particularly to Prof. Arunava Misra. It was published in the Vidyasagar College Magazine Dec. 1933. vol 1.—Editor)

University College of Science
92, Upper Circular Road.
Calcutta-11-2-24

Correspondences with Mahatma Gandhi

বঙ্গদেশে খদ্দর আন্দোলনে আচার্য প্রফুল্লচন্দ্র ও মহাত্মা গান্ধীর মধ্যে ঘনিষ্ঠ যোগাযোগ ছিল। ১৯২৪ খ্রীষ্টাব্দের ১২ই ফেব্রুয়ারী প্রফুল্লচন্দ্র গান্ধীকে এ বিষয়ে যে পত্র লিখেন নানা কারণে তাহা এই দুই মহাপুরুষের সম্পর্ক জানিবার পক্ষে বিশেষ গুরুত্বপূর্ণ। পত্রখানি মুদ্রিত হইল।

Erode
25th September, 1921.

"Dear Dr. Ray–

I received your letter only this morning. As you will see from the stamps on the envelope it had a chequered career.

Between now and the date of your letter much time has elapsed. I observe too that you have large subscriptions from Jamal Bros, and Birla Bros. What is the position now? How is it that big zemindars of Bengal do not bear such burdens? Whilst it is good that all India shares the burden with Bengal. Why should the latter not shoulder the whole when she is well able to?

I do want to have a long chat with you and feel for myself that you are the same simple. noble soul I know in 1901, and on my part to assure you that I had not gone down during all these twenty years since we met.

Yours sincerely,
(Sd) M. K. Gandhi

কোকনাদে খাদি ও হস্তশিল্প প্রদর্শনী উদ্বোধনে (২৫শে ডিসেম্বর ১৯২৪) আচার্যদেব যে মনোজ্ঞ ভাষণ দেন তার উপসংহারে তিনি বলেন— "As I conclude my eyes are turned to my Yarvada gaol—inside the iron bars of which lies encased the mortal frame of the patriot—saint of modern India the purest and noblest soul that ever drew breath he who thought and preached and lived on the gospel of India's salvation."

True copy

University College of Science
and Technology
Department of Chemistry
92, Upper Circular Road
Calcutta. 2.10.1939

This is to Certify that Sj Kaliprasad Mandal is Known to me, He has passed the Matriculation Exammination from the Calcutta University this Year. He is an evergelit young man of active habits.

Ha bears an excellent—moral charait.

Sd, P. C. Ray.

ACHARYA ROY'S APPEAL

To

The Student and Youngmen of Bengal.

A terrible disaster, unprecedented in its fury, has again befallen on unhappy Bengal. Lacs of men and women, our brethren and sisters in North and East Bengal, are in the grip of severe distress. The condition of cattle is equally pitiable. You are reading in the daily papers harrowing tales of their sufferings. I am well aware of the pinch prevailing throughout the lenght and breadth of the land but all the same we own a duty to our stricken victims.

Whatever you can collect either from among your selves or from the general public in the shape of clothing old and new, rice and money will be most gratefully received by me. Arrangements have been made for their transmission to the affected areas.

I appeal to you to eschew all sorts of luxury at this hour of dire calamity. The part played by the students and youngmen of Bengal during the North Bengal Flood of 1922-23 will ever from a bright page in the history of modern Bengal. The country has advanced vastly during the interval and I hope your contribution will be even greater this time. I trust I am not appealing in vain.

P.C.Roy,
College of Science,
President, Sankat Tran Samity.

Calcutta Aug. 17

(Amrita Bazer Patrika–18.8.31. we are indebled to the National Library Archives authority for this letter.)

১৯২১ সালে ইয়ং ইন্ডিয়ায় গান্ধীজী লিখেন—'Dr. P. C Ray's frank recognition of the Charka is a valuable acquisition'

...বেঙ্গল কেমিক্যালে প্রফুল্লচন্দ্রের যে share ছিল তাহার অধিকাংশই তিনি এই প্রতিষ্ঠানে দান করেন (খাদি প্রতিষ্ঠান)

১৯২৪ এর ১২ জানুয়ারি 'দি ফরওয়ার্ড' এ আচার্য দেবের স্বাক্ষরযুক্ত নিম্নলিখিত আবেদনটি প্রকাশিত হয়।

Khadi Pratisthan

'I am organising Khadi work in Bengal through Khadi Pratisthan. Arrangements have been made to supply kapas, handspinning machines and all to spinnig apliances from the Pratisthan. Besides the Khadi production and distributio are also being opened. Those who have surplus stock of Sudha Khadi for disposal or those who want to keep a stock of khadi for sale or need help for Snoha Khadi production wil please communicate with the secretary, Khadi pratisthan, 39, Charak·Danga Road, Narkeldanga, Calcuctta.

P. C. Ray*

My Dear Mahatmaji,

I purposely abstained from going to Sarsoon Hospital on a pilgrimage or even writhing to you, as I throught that so long as you were confined to bed you should not in anyway be disturbed. But your kind wire induces me to break the verb I impose upon myself.

I confess I have been watching all the rejoicings and outburst of enthusiasm in Bengal on the occasion of you release with mixed feelings. Our people are nothing if not immotional and sentimental, and the frothy effervescence will soon subside leaving not a trace behind, of the throughly who are flocking to the public meeting to attend the Golden celebration, barely one percent is clad in Khaddar. What a contrast to the site which greeted my eyes at cocanda where I found thousands, drawn from the humblest classes and coming from the remotest villages, flocking to Gandhinagar, and full ofperfent of then were clad in pure homespun! Nor do I find any serious and sustained effort to remove the course of untouchability. Everyone is

for royal road to Swaraj and would avoid the through and terious patth. It is not for me to pronounce any opinion on the advisibility or otherwise of the return by congressmen to the Councils, but this much I may be permitted to say that if a portion of the energies which have been spent over this office had been diverted to the constructive programeme sketched out by you, the way to Swaraj would have been by this time considerably shortened.

You will probably remember that when the Malyav conference was in serious at Bombay it was my proviledge and pleasure to sit by your side for hours togather for two consecutive days; and I promised to do my utmost to carry the message of Khaddar to my Bengalee countrymen and so also to take practical steps towards its production. Thanks to the cooperation and devoted service of a noble band of workers, I have been able to do a little, but the work is uphill and requirs almost patience and superhuman efforts to achieve success. The more, however, I work in this directon the more convinced I am becoming that in charka lies the economic Salvation of India. And in my coconada address on the "Message of Khaddar" I tried that in your letter to the Moulana Sahib you have laid particular stress on the charka as the only remedy for Indians growing paupersim.

I must stop here and should not intrude further upon your repose, I need scarcely add that my heart yearns after you, but for the present, I must deny myself the pleasure of paying you a visit.

May God soon restore you to full health so that you may once again guide the future destiny of your nation.

Yours very sincerely,
P.C. Ray

University College of Science,
92, Upper Circular Road
Calcutta 11.2.24

Erode,
25th September, 1921

Dear Dr. Ray,

I received your letter only this morning. As you will seen from the stamps on the envelope it had a chequeved career.

Between now and the date of your letter much time has elapsed. I observe too that you have large subscrptions from Jamal Bros. and Birla Bros. What is the position now? How is it that big Zamindars of Bengal do not bear such burdens? Whilist it is good that all India shares burden with Bengal. Why should the latter not shoulder the whole when she is well able to?

I do want to have long chat with you and feel for myself that you are the same simple, noble soul I knew in 1901, and on my part to assure you that I had not gone down during all these twently years since we met.

Yours sincerely,
(Sd) M K Gandhi

২৫ ডিসেম্বর, ১৯২৪

কোকনদে খাদি ও হস্তশিল্প উদবোধনে ভাষণের শেষাংশ (আচার্য প্রফুল্লচন্দ্রের সম্বন্ধে মহাত্মাজীর—সম্পাদক)

Mahatma Gandhi's Letter to P. C.Ray. By Courtsey, Gandhi Museum, Barackpore,—Editor,

We express our indebtedness to the authorities of the Museum—Editor.

361. Letter to Dr. P. C. Ray

October 2, 1928

Dear Dr. Ray,

Here is the series of articles contributed to *Young India* by Prof. C. N. Vakil on India's poverty. Prof. Vakil wrote to me saying that you wanted the series. It took some time in collecting the articles as some of the issues containing the articles were not easily available.

I hope you are keeping well.

Yours sincerely,

Dr. P. C. Ray
Calcutta
From a photostat : S.N. 13539

33. Letter to Dr. P. C. Ray

Autust 27, 1918

Dear Dr. Ray,

You may have heard of my illness. It was a very serious attack of dysentery. Though I seem to be convalescent, I am utterly prostrate with weakness. I can scarcely move out of my bed or even sit in it for any length of time. The great question is how to build up this broken-up body. I have abstained from milk and its products for a number of years and vowed to do so for life. I therefore need a substitute for milk and butter.Hitherto in my strength, I have found an excellent substitute in groundnuts, walnuts and such other nuts, but fact obtained from all these nuts are too strong for my delicate stomach. I need an eact vegetable substitute for ghee and milk. I have tried *kopra* milk and almond milk before now. The physiological action of thee milks is totally different from that of cow's milk. Do you know any vegetable substitutes for ghee or butter and for milk? If you do, kindly name them, or better still, if you can procure them, sent them, I am told that up in the north they manufacture ghee out of delicate *mhoura* seed which is not the same as the ordinary ghee but is the same as olive oil. Please enlighten me if you can. It hurts me to think that my only letter of a recent date addressed to you should be of so utterly doleful and selfish character. Forgive me if you can.

Yours sincerely.

From the manuscript of Mahadev Desai's Diary. Couresy : Narayan Desai

567. Letter to Dr. P. C. Ray

May 22, 1932

The work you are doing is difficult, but it is the only way to help our people. There is no substitute for charkha for universal relief.

It is nonsense for you to talk of oldage so long as you outrun young men in the race for service and in the midst of anxious times fill rooms with our laughter and inspire youth with hope when they are on the brink of despair

Mahadevbhaini Diary, Vol. I. pp. 169-70.

241. My Notes

Acharya Ray Spins Daily

Acharya Ray is now over sixty years old. But he has started spinning. He writes :

> As a matter of fact, the music of the spinning-wheel has proved a solace to my mind. My faith in khadi grows day by day, and as my khadi work increases, the spinning-wheel has come to be a perennial fountain sustaining my enthusiasm.

Thus if very busy veterans like Acharya Ray have begun to spin, why should not young men and women with lots of leisure do so too? It is easy to understand the source of Acharya Ray's Enthusiasm. For many years he has been at the job of bringing relief to famine-stricken people of Bengal. He has realized in the course of it that mere charity saps the character of the famine-stricken and hence does more harm than good to them. What sort of work can be given to thousands of menand women to enable them to earn their livelihood? What else but the spinning-wheell can be so all-embracing? It was not difficult for his keen and well-meaning intellect to discover this.

644. Letter to Dr. P. C. Ray on spinners' Welfare

In recommending to Khadi Pratishthan, in which he is deeply interested and to which he has made handsome contrubutions out of his savings, the scheme for raising the wages of spinners and for making self-sufficient khadi, the main activity of the Pratisththan Acharya P.C. Ray sends me the following nine points which besides being valuable inthemselves show the deep faith he retains in khadi and the activė interest he takes in it even at his advanced age.

Harijan, 28.9.1935

APPENDIX VI

Spinners' Welfare

A few points why Khadi Pratishthan, devoted to the khadi work in Bengal, should continue to give work (in a graduated higher scale of wages) to spinners and find sale for their products in conjunctin with self-spinning work :

1. Khadi is never meant to enter into competition with matching. (i.e., mill-) made cloth.

2. Khadi represents 'back to village' cry.

3. Village life-means simplicity and freedom from contamination of urban 'civilized and refined' mode of life, i.e., life represented by cinemas, race, gambling and other nonsensical things.

4. In the mills the workmen get higher wages, but the are converted into so many automata and druges in the mill area. Half their wages again are consumed in drink and prostitution.

5. The poor women (generally widows) who ply the charkha and earn a bare pittance are thereby enabled to be self-supporting and not dependent on their male relatives who really sit idle and make the helpless women dependent on them work like drudges and galley-slaves. Thus the latter are really freed from sweatd labour.

6. Those who play the charkha are seldom or never whole-time workers; only during the intervals of household duties they utilize their leisure hours. So it would be wrong to compare their off-time lablur with that of the sweated labour of the mills.

7. In Bengal there is only one crop (the Aman Paddy) in most parts. That gives peasants occurpation for barely three months in the year. Even where there is second crop which gives employment for a couple of extra months or so, for seven months they sit idle. Hence, if the people could be persuaded to ply the charkha, they would have a second occupation or another string to the bow. Thus during a failure of crop due to drought or flood (as if often the case in Bengal at any rate) plying the charkha would be a 'Godsend'. The people

won't starve or be dependent on chance doles distributed in the relief countries.

8. The spinners are not the only people benefited; along with the spinners a large body of weavers find occupation; in fact, on week days (especially during the *hat* or village market days) the weavers in the khadi centres with their woven dhotis and shirtings eagerly look for payment. Then other subsidiary artisans would be benefited, e.g., the village carpenters, etc., making charkas.

9. A unique experment is going on in the Atrai and Talora centres (visited by you in 1925). After 12 years of hard labour, expenses, not to speak of the sacrifies of voluntary workers, at last we have got a body of willing 'self-spiners'. I have myself watched with interest and joy how the women look forward to the *saris*, bodies, and *chadars* for children, supplied in exchange for the yarn.

Harrijan, 28.9.1935 P. C. Ray

361. Letter to Dr. P. C. Ray

October 2, 1928

Dear Dr. Ray,

Here is the series of articles contributed to *Young India* by Prof. G. N. Vakil on India's poverty. Prof. Vakil wrote to me saying that you wanted the series. It took some time in collecting the articles as some of the issues containing the articles were not easily available.

I hope you are keeping well.

Yours sincerely,

Dr. P. C. Ray
Calcutta

From a photostat : S. N. 12539

362. Letter to Nanakchand

Satyagraha Ashram, Sabarmati,
October 2, 1928

My Dear Nanakchand,

I was delighted to receive your letter. I am glad that you are doing well. You must now become strong, healthy and hardy. Though you have got there access to all the luxuries of life, you must rigiorously deny them to yourself and evolve a strong will and strong constitution before you think of coming here again. You have seen something of the Ashram life. you can practices. ....

Whether they—they .... is true in the Hindu faith will abide, what is untrue will fall to pieces, Every living faith must have within itself the poem of rejuvenation if it is to live.

Harijan, 28.9.1935

643. Soya Beans

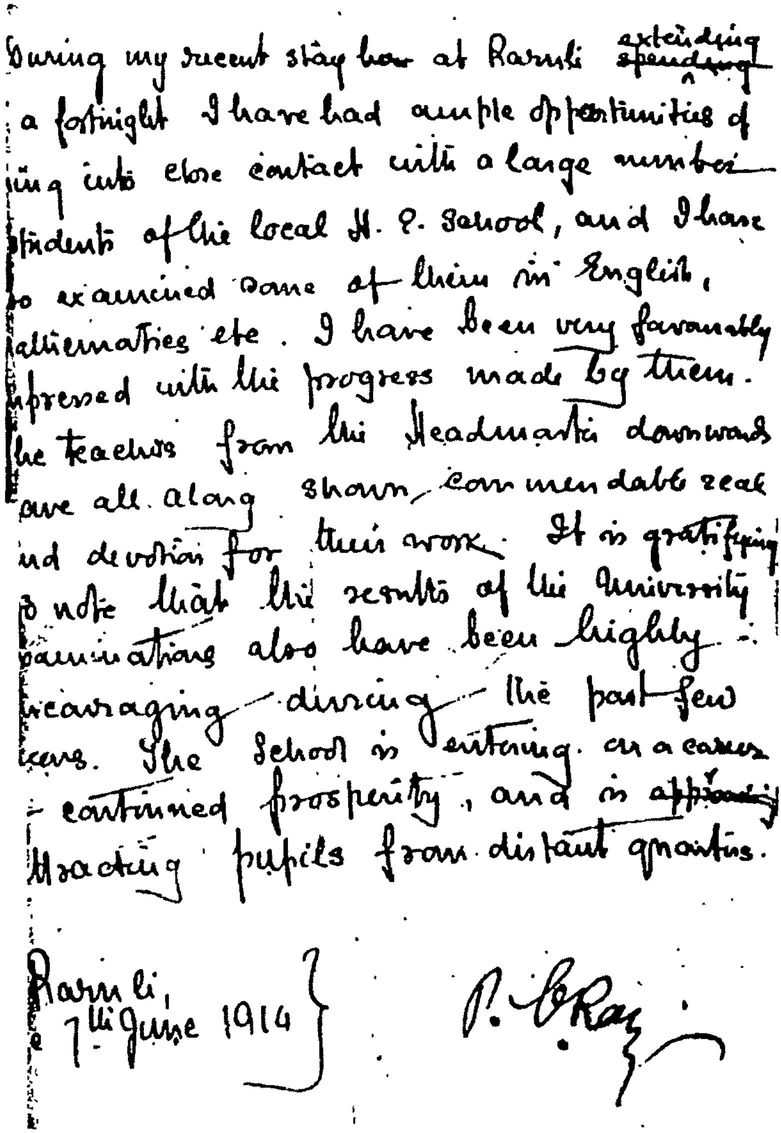
As soya beans are cliamed to possess high nutritive value, I reproduce the following from pamphlet No. 7 published by the Bombay Presidency Baby and Health Week Association to enable the food reformer to make experiments.

Harijan, 28.9.1935

644. Acharya P. C. Ray on Spinners' Welfare

In recommending to Khadi Pratishthan, in which he is deeply interested and to which he has made handsome contributions out of his savings, the scheme for raising the wages of spinners and for making self-sufficing khadi, the main activity of the Pratishthan, Acharya P. C. Ray sends me the following nine points which besides being valuable in themselves show the deep faith he retains in khadi and the active interest he takes in it even at his advanced age.

Harijan, 28.9.1935

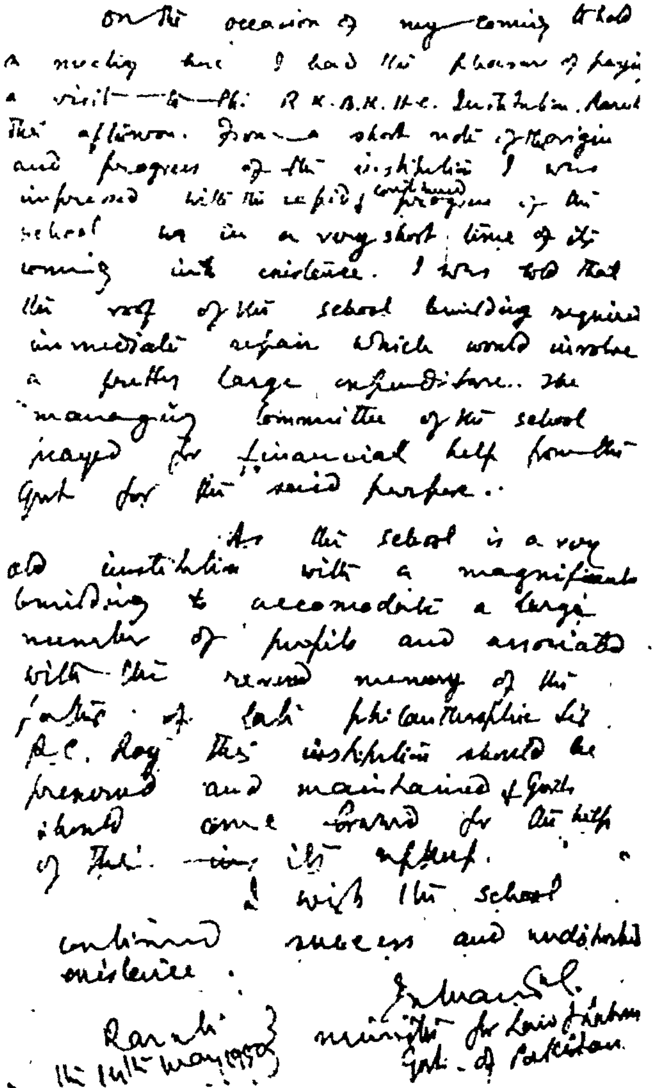


During my recent stay here at Raruli ~~spending~~ extending
a fortnight I have had ample opportunities of
ing into close contact with a large number
students of the local H. E. School, and I have
o examined some of them in English,
athematics etc. I have been very favourably
mpressed with the progress made by them.
he teachers from the Headmaster downwards
ave all along shown commendable zeal
nd devotion for their work. It is gratifying
o note that the results of the University
xaminations also have been highly
ncouraging during the past few
ears. The School is entering on a career
continued prosperity, and is ~~approaching~~
ttracting pupils from distant quarters.

Raruli,
7th June 1914

P. C. Ray

আর কে বি কে হরিশ চন্দ্র কলেজিয়েট ইন্সটিটিউশনের পরিদর্শণ বইয়ের অংশ বিশেষ



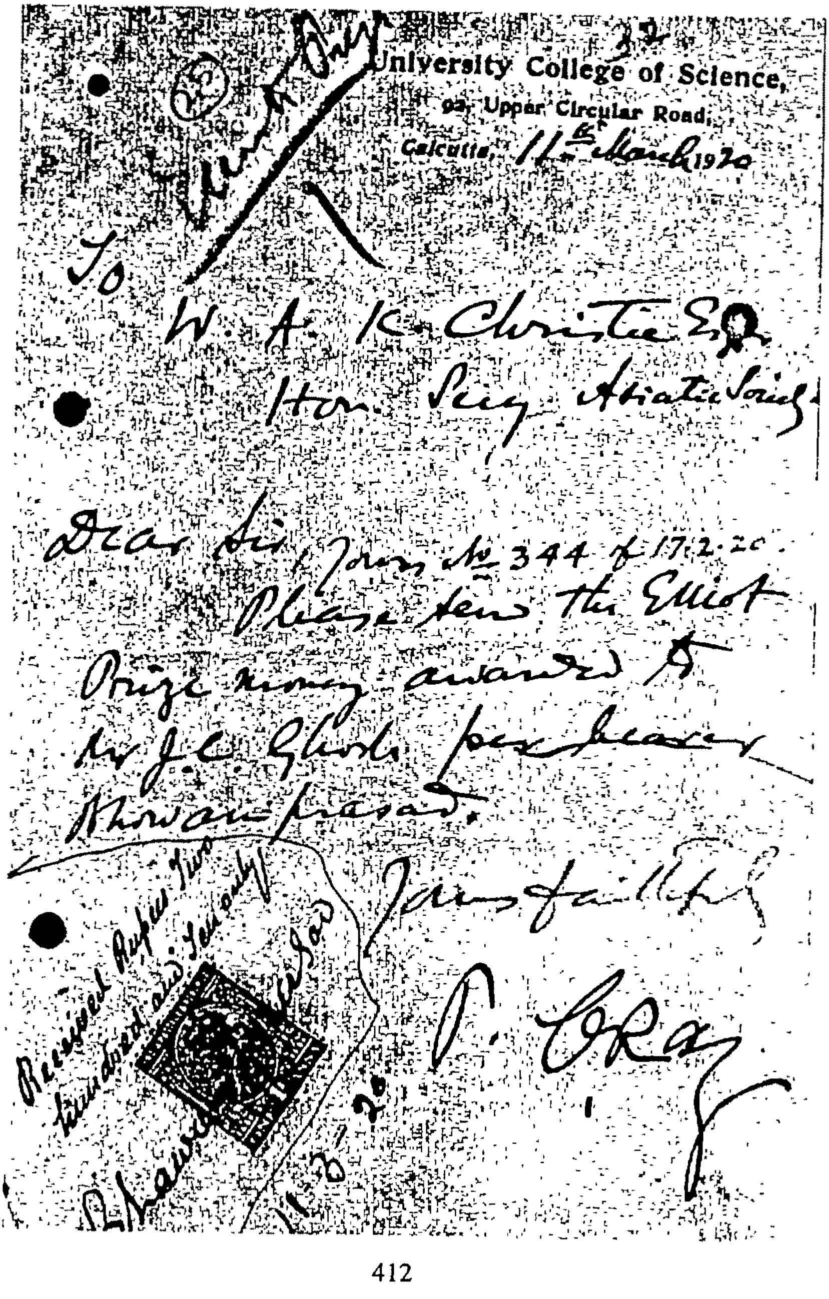
On the occasion of my coming to hold a meeting here I had the pleasure of paying a visit to the R.K.B.K.H.C. Institution here this afternoon. From a short note of the origin and progress of the institution I was impressed with the rapid continued progress of the school in in a very short time of its coming into existence. I was told that the roof of the school building required immediate repair which would involve a pretty large expenditure. The managing committee of the school prayed for financial help from the Govt for the said purpose.

As the school is a very old institution with a magnificent building to accomodate a large number of pupils and associated with the revered memory of the father of late philanthrophic Sir P.C. Roy this institution should be preserved and maintained & Govt. should come forward for the help of this ~~[illegible]~~ its upkeep.

I wish the school continued success and undisturbed existence.

J. N. Mandal.

Raruli } Minister for Law & Labour
the 14th May 1950 } Govt. of Pakistan.



32

[illegible] Only

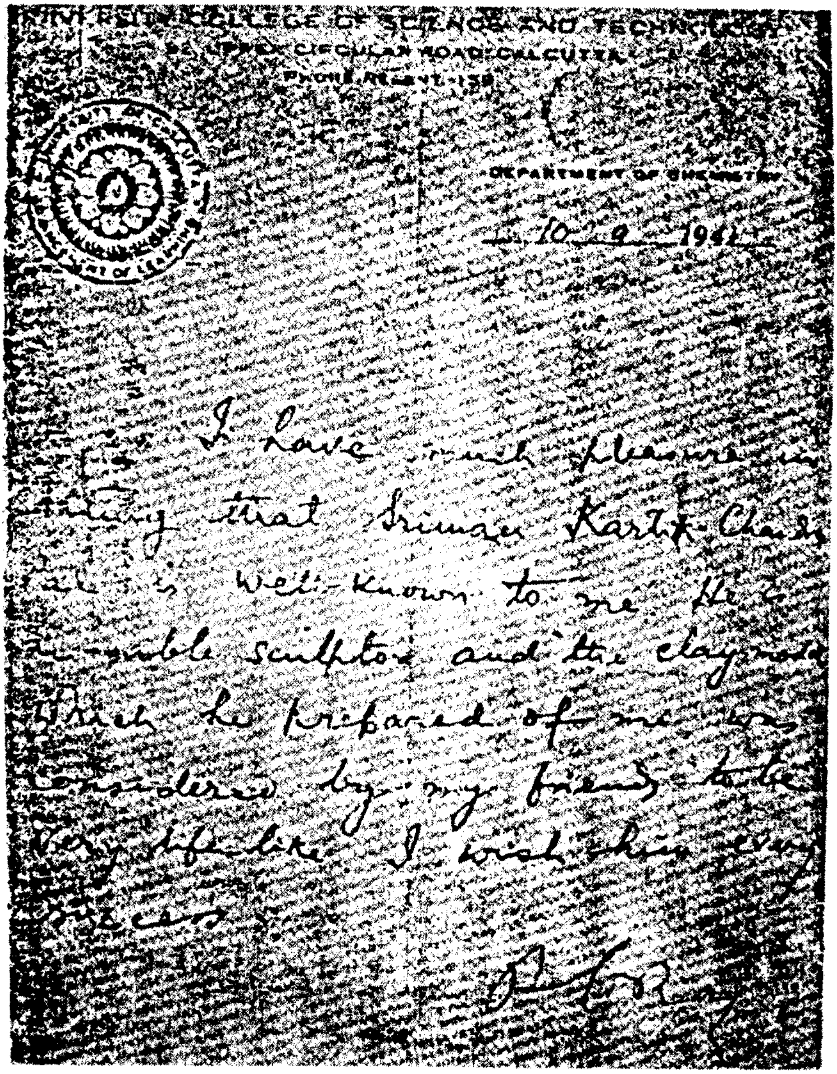
University College of Science,
92, Upper Circular Road,
Calcutta, 11th March 1920

To
W. A. K. Christie Esq.
Hon. Secy. Asiatic Society

Dear Sir,
Yours No 344 of 17.2.20.
Please send the Elliot Prize money awarded to Mr J. C. Ghosh per bearer Bhowani prasad.

Yours faithfully
P. C. Ray

Received Rupees two hundred and seventy only
Bhawani Prasad
13.3.20

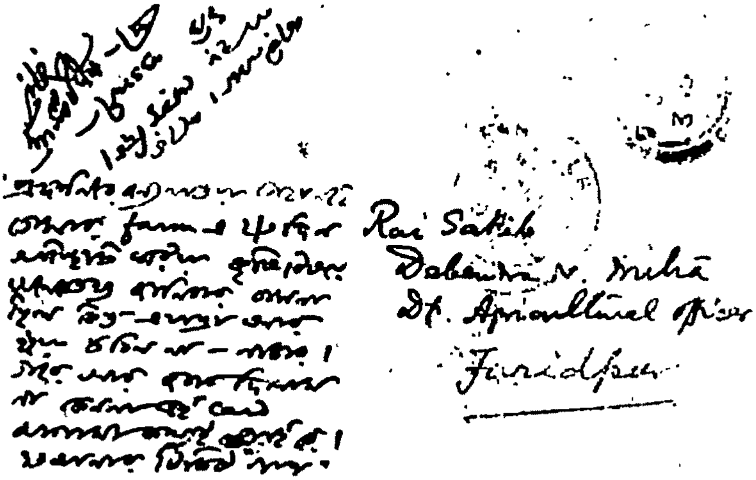


UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY
92, UPPER CIRCULAR ROAD, CALCUTTA
PHONE REGENT-138
DEPARTMENT OF CHEMISTRY

10-9-1942

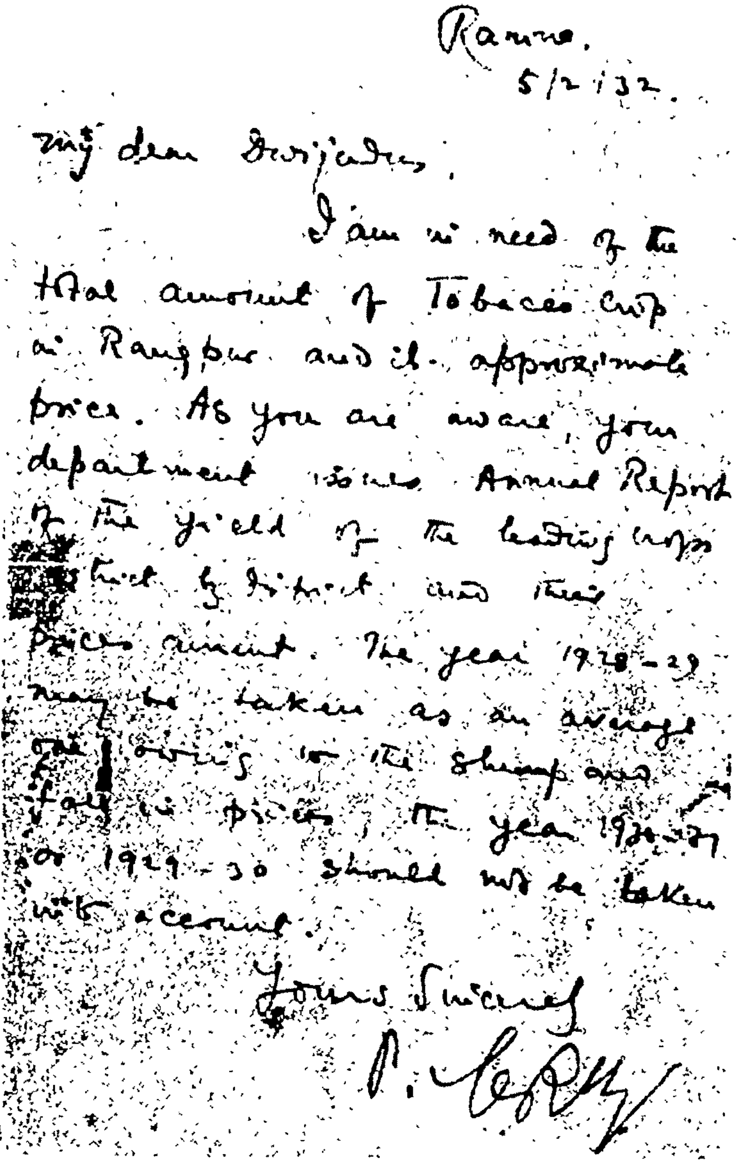
I have much pleasure in stating that Srimaan Kartik Chandra [illegible] is well-known to me. He is an able sculptor and the clay model which he prepared of me was considered by my friends to be very life-like. I wish him every success.

P. C. Ray



[illegible]

Rai Sahib
Debendra N. Mitra
Dt. Agricultural Officer
Faridpur



Ranno.
5/2/32.

My dear Girijadu,

I am in need of the total amount of Tobacco crop in Rangpur and its approximate price. As you are aware, your department issues Annual Report of the yield of the leading crops district by district and their prices current. The year 1928-29 may be taken as an average one; owing to the slump and fall in prices, the year 1930-31 or 1929-30 should not be taken into account.

Yours sincerely
P. C. Ray

Press Statement

Press Statement

A Reply to P.C. Roy's letter by Subhas Bose about Relief Fund of 1922

The following letter has been sent by Sj. Subhas Chandra Bose to Sir P. C. Roy in reply to the latter's letter to Sj. Bose :

Calcultta
The 23rd August 1931

My Dear Sir,

I am in receipt of your letter of the 22nd August 1931. I am constrained to say that the letter does not do justice to yourself.

Regarding your presidentship of the Congress Relief Committee; I have already said that I made a public pronouncement at theAlbert Hall meeting on the 10th August. I was standing next to you while speaking and you could not have missed my words. While no objectios came from you, how could I surmise that you would later on objet to being the President of the Congress Relief Committee? During the lst ten years both you and I have served on Relief Committees organised by the Congress and you have always (or practically always) been the President. It was therefore only natural that we should elect you as the President on this occasion. This however is the first occasion on which you have declined to be the President of a Congress Relief Comittee.

THE PRESIDENTSHIP

The appels that have been made for funds in the Calcutta Papers have appeared in the same from the very begining and bear the names of all the signatories. The appeal was drafted before the Committee elected you as President. You will kindly remember that when the B.P.C.C. formed the Relief Committee they appointed the Secretary only and left it to the Committee to elect their own President and Treasurer. That is why in the very first appeal and in all the subsequent publicatoins of that appeal the name of the Secreatry appears without the names of the treasurer and the President.

In the messages sent to the whole appeal nor the neither the whole appeal nor the names of all the signatories were sent. But in order to distinguish the Congress Relief Committee from other Committees the names of the Committee like yourself, Ramananda Babu, Sir

Nilratan Sircar and others were published and the name of the President was also given. I am attaching for your information a copy of one such massages. Sofar as Bengal is concerned, I think it was common knowledge that you werer the President of the Congress Relief Committee. To confirm what I say i am sending a copy of a hand bill which will show that your name was actually advertised in many places as the President of the B.P.C. flood and Famine Relief Committee and you are a signatory to this appeal which states that you are the President of the B.P.C. Flood and Famine Relief Committee.

I have nowhere in the past minimised you invaluable servies to the causes of the country nor shall I ever do so. But though the Congress Relief Committee will be profoundly grieved to lose your kind ofices, I may respectfully assure you that the Committee will survive the shock of your non-co-operation.

The letter I published regarding the Bengal Relief Committee was meant for the President of the B.P.C. Flood and Famine Relief Committee. I was not sent to you because I was not sure that you would agree to call yourself the President of that Committee.

RELIEF FUND OF 1922

Your explanation regarding the expenditure of the funds of the Bengal Relief Committee after gratuitous relief was stopped is far from convincing. I do maintain that after gratuitous relief was adopted some time in 1922, the further use of the relief fund for the promotion of cottage industries,hospitals, dispensaties etc. was entirely unauthoried. The Bengal Relief Fund was expressly started with the intent and purpose of spending the surplus funds for gratuitous relief in case of future floods famines in any part of Bengal. You will kindly remember that not long after the North Bengal Flood, when discress broke out in Chittagong some of us pressed for a grant for relief work in Chittagong. sj. Satish Chandra Das Gupta did not favour of his opposition the committee did make a grant.

DIVERTED TO OTHER PURPOSES

I would beg of you so imagine what the late of Bengal would have been as on such a crisis as the present one the Bengal Relief Committee had come forward with a magnificent grant of one lac of rupeees.

This would easily have been possible to-day if the funds of Bengal Relief Committee had not been diverted by its custodians in an unauthorised manner. No one will any for one moment that the starting of dispensaries and hospitals and the promotion of cottage industries are not desirable activities. My contention is—"What right had the custodians of the Bengal Relief Fund to divert the funds to a purpose other than that for which the fund sancion or the committee or even of all the Secretaries?"

You will pardon me, Sir, if I say that you have side-tracked the issue by referring to the glorious sacrifices made by Sj. I. N. Sen, and Sj. Niren Dutta. But their sacrifices will not right the wrong that was done in diverting the Funds of the Benal Relief Committee. Personally I am a propertyless man.But even if I had property and had made a gift of the whole of it to the public–that sacrifice would not have justified my action in setting up a hospital at Serajganj or in promoting cottage industries at Tangail with the funds that I am now raising for the Relief of theflood-stricken people of my province. You have complained that I am complaing after a lapse of several years. I am complaining now because I feel that to-day the country cannot afford to raise a big fund though our countrymen are in such dire distress. Therefore the surplus funds of the Bengal Relief Fund should have been available for gratuitous relief. If the country had been able to raise a big fund to-day, I would not have complained. I would not mind if the grant to the Khadi Pratisthan be in the nature of a temporary loan because in that case the Khadi Pratishan can repay money to the Bengal Relief Committee whenever required to do so. But I would certainly object with all the strength at my command if the grants be in the nature of a permanent gift. If my information that the Khadi Pratisthan is a losing concern be correct then there is little hope of our recovering the money from Khadi Pratisthan for relief work.

You, Sir, have said that you have been administering the funds of the Bengal Belief Committee with the help of colleagues like Sjs. Satish Chandra Das Gupta, Noren Dutta and Indra Narayan Sen Gupta. I am thankful to you for the information but I would respectfully remind you that I am one of the Secretaries of that Committee who has unfortunately been completely ignored by you.

THE APPEAL OF THE NEEDY

You have said that I do not remember the activities of the Relief Committee after gratuticus relief was stopped in 1922 because probably I was not interested in it or I was in internment at the time. In reply to that I say taht I was outside jail for full 2 years after the gratutions relief was stopped and as far as my information and memory go–the diversion of funds did not take place with the sanction of the Committee. You have regered to the accounts being audited and published. That ponat was unnecessary because I never suggested that any defalcatin took place. My sole contention is that the surplus funds of the Bengal Relief Committee were diverted in an un-authorised manner and that is why to-day the money is not available when we need it so badly I would once again beg of you with folded hands on behald of the flock-stricken people of this province to use all your influence with the "Khadi Pratisihan' and see if that money could be recovered.

We would not have made this request to-day (and I have not done so up till now) if the country had been in a position to raise a big fund for gratutious relief on the present occasion.,

You have throughout your letter attempted to rebuke me I don't mind that considering your age and position and the regard in which I hold you.

DESHBANDHU'S COMMAND

But there is one point wherein you have caste an indirect, aspersion against my late leader which I can not but strongly resent. You have attached for leaving Santahar at the call of Deshbandhu and you have tried to make capital out of it. To that I may say that I am proud that throughout my public career I was over loyal to my leader and I was not one of those who directly on indirectly tried to undermine his, position or influence. Deshbandhu sent repeated telegrams to me to come to Calcutta. I sent some of these message, to you and requested you to talk out the matter with Deshbandbhu and get his consent to my staying on at Santahar. I also told that if you fail to do that I would ultimately have to leave Santahar because being a disciplined soldier I would ultimately have to do his bidding.

You could not or would not settle the matter with him and that is why ultimately I had to return to Calcutta. But it ill becomes you to distort facts. It is not true that I left Santahar suddenly. You had a Iong notice about my departure and inspite of repeated telegrams from Deshbandhu I did not actualty leave Santahar until I felt that the work could very easily be handed over to some one else. You know as well as I do that I was on the spot from the very beginning of the floods and my stay there was more or less ubroken. Towards the end the organisation had been made through and complete and Dr. I. N. Sen was then second-in command. When I left Santahar, he stepped into my shoes and the work went on smoothly. You know that Deshbandhu required my services for the organisation of the Swaraj went on smoothly. You know that Deshbandhu required my sarvices for the organisation of the swaraj Party and you have never been kindly disposed towards that party though you have from time to time issued manifestoes supporting canditates for the legislatures including non-Congress or anti-Congress Candidates.

But whatever you feeling about the Swarj Party may be I donot think that you would in fairness attempt to minimise the little service I had the fortune to render to my countriymen in North Bengal nor should you cast an indirect aspersion against my later leader for requisitioning my services for the organisation of the Swaraj Party.

In conclusion I shall only say that in what I have said or written to you I have stood for a principle and I hope that you will not think that my personal feeling towards you have changed. If unfortunately you think so it will give me much pain.

I am
Yours sincerely,
SUBHAS CHANDRA BOSE.

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* Liberty–Monday Augst 24, 1931
Courtsey : National Library-Archives.

Acharya Roy's Letter

Acharya P. C. Roy has sent the following letter to Sj. Subhas Chandra Bose, I, Wellington Square, Calcutta :–

My dear Subhas,—I have your letter of the 19th instant, I already gave you reasons why I could not be President of the B.P.C.C. Relief

Committee. You write that on the 8th August your Committee clected me President. But between the 8th and 15th you did not communicate this to me nor do the appeals and notices issued by the B.P.C.C. Committee mention my name as the President although the name of the Secretary was specifically mentioned. I accepted Presidentship of the Sankat Tran Samity on the 14th inst.

You mentioned that you issued press message all over India announcing my name as President. It is strange that no such press messages appeared in Bengal. If it is true then you have used my name without my permission and knowledge. You have committed a serious brech of code of honour. Kindly send me copies of all such telegrams and messages. I am afraid that you did not want me but wanted to use my name.

Having regard to the events that have happened since my last, letter to Captain Dutta expressing my inability to be president of your Committee, you have left me no alternative but to withdraw my name even as a member of the B.P.C.C. Flood and Famine Relief Committee. Now I shall deal with another letter of yours published in the *Liberty* of yesterday apparently meant for me but strangely not delivered to me containig allegations against the working of the Bengal Relief Committee on 1923.

After the first aid was rendered instend of giving gratuitous relief, the Committee agreed to do some work of permanent good to the people Charka had then already been given for relief work. The Charka work was agreed upon by the Committee to be continued and along with it a hospital was a run so long as the funds lasted. At this time the Committee had 1,16,000 (one lakh sixteen thousand rupees) asets in all. This included fixed property like land, buinding, furniture at different .... There ex-Inded ther was Rs. 85,000 to carry on hospital and charka work as long as possible.

At first about 40 workers were engaged inCharka work. The result is that the money spent on Charka has given the people of the locality a sort of staying power during times of distress. During the present flood, which has also affected the old flooded areas, in those parts where Charka was continued, people are relying upon Charka for relief–the object of the Committee to substantially aid the people has been fulfilled.

Another benevolent work was undertaken and is still continued. It is the maintainance of a hospital and a dispensary at Aatrai. About 70 to 80 patients receive treatment and medicines every day free. People from miles come and bloss this as a magnificient piece of relief.

The funds were until send making the site of Atrai a suitable one for work of a permanent nature. The Committee has 20 Bighas of excelent land in a lovely site at Aatrai and 13 Bighas of land at Talora. At both these places there are build ings suitable for accommodation of worker and for carrying on the work. These were built out of the cash then in hand, a portion of which thereby got fixed up.

After subscription ceased to come, it was a question of continuing as long as possible and maintained the work undertaken. The hospital and charka work are conducted under the guidence and control of Dr. Niren Dutta whose capacity and devotion is known to the public of North Bengal. His repetation as a sucessful physician is one of the assets. which has endeared Atrai relief base to the people of the locality. The Charka work, although continued to be a spending work like the hospital, has been so far successful that relief yarn in the finest yearn in Bengal and Relief Khadi hopes to stand equal to Andhra Khadi in texture and cheapness. A stage has been reached when even the Khadi work promises to be self-supporting. The present position is that Rs. 10,000, the entire present surplus is with the current work. Khadi Pratisthan manages the selling side only. The Pratisthan spends four to five thousand rupees annually for the relief organization but does not take anything from it and has helped to keep the work alive all these years.

I am sorry you do not know all these. When gratuitous relief was stopped and busking operations were closed and Charka work was begun, may be you were not interested in it and therefore you do not remember or it may be, you were in internment at that time. The accounts were audited and published at that time. I invite you to come to Atrai and acquaint yourself with the work done and see the accounts past and present.

Dr. Niren Dutta has been selflessly serving these nine years. He is a bachelor. He does not take aby remuneration. It is through his sacrifices that it has been possible to continue the work of Relief Committee for such a long time. He is still there at his post now devising means for protecting the people from the effect of the present flood. This work through God's grace is continuing through nine years. I hope you do not want all these activities to stop.

You may remember that in 1922 when the flood broke in, you were placed in charge of the entire relief operations from Santahar Base. Satish was then at Calcutta office. Before the work was fully organied during the days of extreme distress of flood, you left the Seva work and suddenly came away to Calcutta evidently for fresh and more congenial field. You did not give us notice, you did not give us time to choose a successor. You left your position of trust and came to Calcutta, never to return. Then the presponsibility was put on the shoulder of Dr. Indra Narayan Sen. He had to give up his Calcutta practice for that. He went there for temporary service and was not prepared for continued work. He had a big family to maintain at Calcutta, but when you came away without giving any time to get prepared, I had to ask Dr. Indra Narayan to take up the work in the absence of any other suitable man. Dr. Indra Narayan had to be fixed up there. He laid to break up his Calcutta establishment, give up Calcutta practice. Now he is a cultivator doctor in a village. He is serving poor villagers. God has rewarded him with poverty.

To day after nine years you come and say that all the money of the Bengal Relief Committee be handed over to your Committee all the monev that I am now collecting for Sankat Tran Samity be handed over to your Committee, not only this you have cliamed on me also. I wish for that happy day when you may be associated with all my benevolent activities, but to-day from your direction I see no signs of it.

I have been administering the funds of the Bengal Relief Committee with the help of colleagues like Satish Chandra Das Gupta, Dr. Niren Dutta, Dr. Indra Narayan Sen Gupta etc. The country knows what service I have been able to render with the help of these selfless friend.

You have cast aspersions on the Khadi Pratisthan also, it being a loosing concern. There is a clear hint as to how the Pratisthan might be managing its affairs. It is a losing concern! So it may be misdirecting Relief money or other funds. That may be your suspicion. But will you know how the Khadi Pratisthan stands? Satish has given his overy thing to it. His every thing means a sum in cash of one lakh twenty five thousand rupees honestly earned which he brought over with him when he left Bengal Chemical his furniture and utensils, his library, his wife's jewellery, the shares of the Bengal Chemical, Life Assurance policies compounded and cahsed. He has kept nothing, not a copper. I protested, but he did not listen. Kshitish also has given his all and his running concern, the Printing Ink Factory. I had also some thing, about fifty thousand rupees in cash and shares. These were also handed over to a Trust and the Pratisthan is the beneficiary. Whatever little income I have the savings, go mainly to the Khadi Pretisthan. Gandhiji has given over two laksh to the Pratisthan. Gandhiji's admires and my friends help the Pratisthan annually with about 10 to 15 thousand rupees. Well, only lately, Satish gave twentyfive thousand rupees by making some soap and selling a soap formula, which be handed over to the Khadi Pratisthan. There is the sacrifie and capacity and devotion of Satish, Kshitish and their group of young men behind the Khadi Pratishtna. That is how the Pratisthan runs. You may cut it, squeeze it, rub it, but you won't get any dirt out of it, only the more you rub, like chandan the sweeter the scent will emannate. I have dwelt at length on these points to clear away all your doubts and of those other who think like you.

It will become you to invite me to become, the President of your Flood Relief Committee while at the same breath you accuse me of mal administration, if not actual breach of trust with regard to the funds of another Relief Committee, namely, the Bengal Relief Committee of ....

.... I did not appeal the B.P.C.C. Relief Committee. You have threatened to label me as an extreme partisan if I do not submit to your coercion. You have now taken up the game of throwing mud on my satinless irrenroachable colleagues and on an institution of my creation having a mission before it namely the Khadi Pratisthan. Well, you may do so, but you won't draw me into a controversy. I need not to defend myself against your insinuations. I hope my countrymen will bear with me for a few more years that I may be allowed to serve my motherland. God is merciful and you are young. May he give you wisdom.

As you have already sent copies of your letter to the Press, without my permission, you asked for, I have no other alternative but to send a copy of the reply to the Press.

Sd. P.C. Ray.

[The full text of the copy of the letter of P. C Ray in reply to Subhas Ch. Bose's letter to P.C Ray, a day before, is reprinted here from the Amrita Bazer Patrika dt. 25th Aug., 1931.–Editor

Courtsey : National Library, Archives, Kolkata

APPENDIX

Kidderpore Student's Association

92, Diamond Harbour Road.

News of terrible floods are pouring in daily from several districts of Bengal particularly from Bogra, Pabna, Dacca, Rangpur, Mymensingh, Dinajpur, Annual crops including "aman" paddy and jute have been totally destroyed. The devastating floods have carried away cattle in large number and those that are left are standing in water without any food. Men, women and children have taken their shelter in trees. In a few districts famine conditions already prevailed before the floods set in and it will be quite impossible to save thousands of people from death and starvation unless immediate help is rendered to them.

The Kidderpore Studennts' Association has organised a charity performance on the Chinese Theatre board on Friday the 28th August at 5.30 p.m. The entire sale-proceeds will be spent for floods relief work. We appeal to you to buy tickets and thereby help the flood and fumine stricken people of Bengal. The money collected by the workers will be handed over to the Bengal Congress Food and Famine Relief Committee of which Acharya P.C. Roy is the president.

Sd/– Diptendra Pramanick, President
Sd/–Sukumar Banerjee, Secretary
Sd/–P. C. Roy
Sd/– Subhas Chandra Bose, President B.P.C.C. 15/8/31
Sd/–Krishna Pada Banerji, President K.C.C.
Sd/–Mano Moban Mokherjee, Vice-President S.C.D.C.C.
Sd/–Santosh Kumar Basu.

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* 'Liberty' Patrika, on 24th Aug, 1931, Courtsey : National Library Archives.–Editor

Press Statement

Acharya Ray's Appeal to Gandhiji : Re-election of Subhas Crucial Issues

An earnest appeal to Mahatma Gandhi and the Congress high command to get Sj. Subhas Chandra Bose, "the most vital and effective link before youth and age in the congress", reflected as Congress President for another term, is made by Sir P. C. Ray in the course of a statement to the press.

Sir Prafulla says : "From my isolation--and at my age--I cannot possibly meddle in the day to day work of the Congress. The Presidential election stands out of the ordinary and I feel called upon to say a word about it.

"It is time the Presidential election in my country does not indicate a large change in policy from year to year, and where there are do many persons who are prominent and deserving by reason of long and devoted service to the country, the choice really becomes difficult. I have given the matter my deepest thoughts, and having considered the situation in the country and abroad I say that Subhas Chandra Bose is the man of the hour and I would earnestly request Mahatma Gandi and the Congress high command to give the matter their full and sympathetic consideration, and the congress organisations to get Sj. Bose re-elected for another term.

The President should be given a sufficiently long time to carry out his plans and programmes. It should be taken into consideration that the congress is no longer a three days' wonder. It takes a considerable time now to master the intricacies and the details of the problems, and just when the President has got an insight into his work, his term expires to the serious loss and detriment of the continuty of the programme of work.

"So far as I can see", he continues, "Subhas chandra is the most vital and the most effective link between youth and age in the Congress. Every body feels that there is a growing alienation of sympathy between the Right and the Left in the Congress; nothing should be done to widen the breach or even to feed suspicions.

A united front of all sections of congressmen is the greated need of the day, Subhas Chandra alone can effect that necessary co-ordination, for he has an understanding of youth which very few of us can claim to equal.

The contining tension in world politics also demands that we should be able to show a unity of prupose and unity of action, The Indian freedom movement must remain alirt and be able to utilise world positics to add strength to itself. Subhas Chandra is a keen and discedening students of foreign politics. He has the drive and the idealism of youth. He has large exprience. He has indomitable courage and energy and devotion. His re-election will be a source of tremendous strength to the Congress and of the greatest help to the freedom movement.

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* The Amrita Bazar Patrika, (Town Edition) November 8, 1938.
Courtsey : National Library Archives, Kolkata

Press Statement

Dont't tread the Beaten Track

Visit to Karatia School And College

At the invitation of the Saadat College,the Roqea High Madrasah and the H. M. Institution, Sir P. C. Ray, accompanied by Moulavi Masud Ali Khan Pani, M.L.A., President of these institutions paid a visit to Karatia. A largely attended meeting composed of the students of the educational institutionns at Karatia. Tangail and Santosh and a good number of members of the teaching staff thereof was held in the college compound. Dr. Ray was given an enthusiastic reception, among others, by the boy scouts and cratacharis and was presented with an address which was read by Principal Ebrahim Khan. Dr Ray in reply enjoined upon the students to wake up to the stern reatities of the struggle for existence lying before them and equip themselves intellectually, morally and physically to take their full share in their coming arena of life. He laid especial emphasis on the imperative necessity of brightening up the economic lot of the land and dwelt at length on how this demanded on the part of young Bengal steady industry, solid character and an inflexible will to win. It was these qualities which counted infinitely more than merely acquiring the stamp of University deplomas.

Yesterday Dr. Ray addressed another gathering composed of the students, teachers, guardians and members of the public at Karatia. He explained to the audience with illustrations how the beaten track of giving the same sort of education to boys and girls, irrespective of their mental capacity, physical fitness and natural bent, was no longer not only inadequate, but positively wasteful and detrimental to their own future as well as to the allround growth of a healthy nationhood. He advised the students and their guardians alike to open up new avenues for exploring the immense possibilities of the economic growth of the country. He also called upon the zemindars and other wealthy men to help their tenants and fellowmen to extricate themselves from their financial entanglements by advancing them loans of their money which was now mostly lying abortively locked up in banks and

Government securities.

Dr. Ray visted the free primary school founded and run by the teachers and students of the college. He also visited the college hostels, both Hindu and Muslim, and the Chand Memorial Public Library at which latter place he was presented with an address. He was deeply impressed by the beautiful and extensive site and the healhy tone of the teachers and the students of the educational institutions here–(A.P.)

N. B. : After visiting Karatia School & College, Tangail, East Bengal (Bangladesh) on sept. 6, 1937, advised the authorities to 'Tread the beaten track' which was published inthe Amrita Bazer Patrika on 8th Sept. 1937.–Editor.
Courtsey : National Library Archives, Kolkata.

Press Statement

Acharya Roy's Address

Acharya Prafulla Chandra Ray drew the attention of the public and the Government to the primary school teachers in Bengal and hoped that the present Ministers, if they were sincere in their protestation that they were there to serve the people, would do something substantial in the way of contributing to the cause of primary education in the province. If they failed to do that, the so-called provincial autonomy would have no meaning for the people.

Acharya Ray referred to the rapid progress that had been done in other countries in the matter of primary education. He emphasised that the first duty of the State was to spread education among the masses. He quoted figures of Madras, Bombay and U. P. and pointed out that the amount spent for education in Bengal was the lowest. In conclusion Acharya Ray appealed to the public and Government to take up the cause of primary education in right earnest.

The All Bengal Primary School Teacher's Conference held on 6th August, 1937 under the Presidency of Acharya Praffulla Chandra Ray at Albert Hall. Calcutta.
Source : Amrita Bazar Patrika, 7th August, 1937
Courtsey : National Library, Archives, Kolkata.

Secondary Education Bill Denounced

"Interest of the people and of the Govemnment are the same in the seven Congress Provinces, hut it is our ill-luck that in Bengal the Ministry are doing things which go against the inierest of the people. I want in reform the system of education in this country to make it up-to-date, but at the same time it must be a bonafide move for reform and not one adopted with same ulterior motive like the present Bill."

In these words Acharya Prafulla Chandra Ray expressed his emphatic protest against the provisions of the Secondary Education Bill, while presiding at a huge public meeting, held at the Albert Hall yesterday evening.

Dr. P. N. Banerjee, M.L.A. moved the following resolution which was carried unanimously :–

"This meeting is of opinion that the provisions of the Draft Secondary Education BIP are of an extremely reactionary and unsatisfactory charcter and are calculated to prove disastrous to the interests of education in this province. The meeting, therefore urges the Government of Bengal to abandon the proposed Bill."

PEOPLE SUSPICION

Acharya Ray referred to the previous history regarding the reform of secondary Educaton in Bengal and pointed out that nothing could be achieved so far owing to the short sightedness and indifference of the Local Government who were more bentupon consolidating their administrative interest in the name of reform them helping a real improvement by making ample provisions for the same.

"It is for this", said the speaker, "that the people have become extremely suspicious about the bonafides of the Government and actively resist any move for official oncroachment upon the independence of educational authorities. This anxiety of the people to preserve as far as possible the freedom of educational institutions, from official interference is all the more justified since the spread of education in Bengal has been due mostly to the work of non-official agencies.

"The fllustrious pioneers in this line to mention only a few, are Raja Rammohun Roy, Vidyasagar, Peary Churan Sircar. David Hare and Raja Radhaoant Dev. Our present status in matters of education has been achieved mainly through the life-long efforts and sacrifice of these and other public workers. Even now, after more than a century of the foundation of the modern system of education in this country, no less than 750 out of 1300 High Schools in Bengal are conducted without any financial assistance from the Government."

NO SECTARIAN IDEA

Referring to the work of these pioneers, Acharyya Roy pointed out that they were never actuated by any sectarian ideas as well evidenced by the character of the system of education they found and advocated. It was no doubt true that these pioneers came mostly from one section of the Bengali community, but the doors of the institutions they founded were flung wide open for all concerned. The educated persons in all sections thus owed a deep debt of gratitude to them and ought to follow in their footsteps by guarding against all sectarian move in the domain of education.

In this connection, Acharya Roy declared that he was for a reform of the system of education in this country to make it up-to-date, but emphasised at the same time that it must be a bonafide move for reform and not one adopted with some ulteror motive like the present Bill. The real character of the Bill was, the speaker pointed out, expossed in the Senate last Saturday by Mr. Justice C. C. Biswas when he said that it will conceal beneath a false exterior all the elements of Secretariat domination with the makeweight of domination with the makeweight of communal bias thrown into the bargain."

NO BONAFIDE OBJECTIVE

"This remark," said Acharya Roy, "of Mr. Justice Biswas aptly explains our opposition to the Bill. It is in tended for the twofold purposes of lightening the department rule over education on the one hand and pander to communal demands on the other. That it has no bonafide educational objective is revealed in the preamble itself which speaks of 'control' and 'supervision' and nowhere of 'improvement' or 'advancement' The two clauses of the Bill will clearly prove it. The first clause says that there will be no affiliated High Schools after one year from the establishment of the Board, and the other clause preseribes the constitution of the Board itself.

"To understand the full effect of the first clause reference should be made to the context provided by the previous educational administration of Khawaja Sir Nazimuddin and Khan Bahador Azizul Haq. The former watned to reduce the number of High Schools from 1200 to less than half and the latter the number of Primary Schools... from 60,000 to 16,000. So the preamble of the present Bill just fits in win with the previous policy."

COMMUNAL MAJORITY

As regards the constitution of the proposed Secondary Education Board. Acharya Roy pointed out that with very change of the Bill from 1926 up to now the proportion of ommunal representation had been inscreasion in the present Board of 34, as many as 15 seats were reserved communally, and from other provisions it could be easily seen that there would be a sure statutory communal majority of 18 in the Board.

This mischief of this system, said the speaker, was properly described by Prof. Zacharia, himself a member of the minority community in the following words; "It creates factions and cause questions to be decided not on their intrinsic merit but on party grounds."

SADLER COMMISSION

Referring to the recommendations of the Sadler Commission. Acharya Roy pointed out that the present Bill violated all the recommendations of the Commission on this subject. The Commission disapproved of the official interference in the internal administration of schools, recommended the Board to be constituted of persons with educational claim and not for communal purposes as had been done. The committee particularly urged that the Board must be so constituted as to enjoy public confidence and in all matters they must carry the public with them.

In conclusion Acharya Roy referred to the failure of Secondary Boards of Education already constitued in other parts of India as shown in official reports and Dr. Ziauddin's "System of Education". Under these conditions, they could not said the speaker but be too careful in treading the same path. What was more urgent was not control and supervison but improvement and expension. This was just the object the Sadler Commission wanted to be kept before all movements for reform of education in this country.

N. B. : Secondary Education Bill, 1937, of the Bengal Govt. was critically analysed by the Acharya & wrote articles–one of the articles has already been published in vol ii. of this series. The Press Statement is published here.–Editor.

Source : Amrita Bazar Patrika, dated 22nd Dec., 1937
Courtsey : National Library Archives, Calcutta.

Acharya Roy's Apeal

To

The Students and Youngmen of Bengal,

A terrible disaster, unprecedented in its fury, has again befallen on unhappy Bengal. Lacs of men and women, our brethren and sisters in North and East Bengal, are in the grip of severe distress. The condition of cattle is equally pitiable. You are reading in the daily papers harrowing tales of their sufferings. I am well aware of the pinch prevailing throughout the length and breadth of the land but all the same we owe duty to our stricken victims.

Whatever you can collect either from among yourselves or from the general public in the shape of clothing, old and new, rice and money will be most gratefully received by me. Arrangements have been made for their transmission to the affected areas.

I appeal to you to eschew al sorts of luxury at this hour of dire calamity. The part played by the students and yougmen of Bengal during the North Bengal Flood of 1922-23 will ever form a bright page in the history of modern Bengal. The country has advanced vastly during the interval and I hope your contribution will be even greater this time. I trust I am not appealing in vain.

P. C. Roy,
College of Science,
President, Sankar Tran Samity.

Calcutta Aug, 17

Source : Amrita Bazer Patrıak, Aug 18, 1931.
Courtsey : National Lıbrary Archives, Calcutta

Press Statement

Protest Against Separation

SYLHET & KACHAR

Reunion With Bengal Demanded

To renew the protest against the separation of Sylhet and Cachar from Bengal and also to express their desire for the union with Bengal, the Surma Valley people residing in Calcutta organised a public meeting at the Albert Hall on Saturday evening under the presidency of Acharya Profulla Chandra Ray.

PRESIDENT'S SPEECH

The president in the course of his speech said that he was very glad to see that the people of Bengal have orgaised this meeting demanding immediate amalgamation of Sylthet and Kachar with Bengal. The time have come when they should all try, to safeguard the interest of the whole province of Bengal, they must continue this agiatation till they were united. There was no other province in India., so thickly populted and they were separated like that they were sure to lose strengh. Therefore it should be their duty to continue this agitation with the same enthusiasm as they have seen during the Anti Partition day agitation about twenty years ago.

Sj. J. Chaudhury in the course of his speech said that if Bengal want improvements intellectually, moraly and financially and socialy they must be united and they try to amalgamate all the Bengali speaking districts with Bengal. If they wanted to drive out poverty from the country they must be united in true sense of the term.

Dr. Protap Chandra Guha Ray said that the separation of these districts from Bengal would weakend Bengal every respect and to avoid that they must continue this agitation till they were united.

Sj. Subhas Chandra Bose thanked the organisers of the meeting for their noble attempt of trying to amalgamate all the Benali Speaking districts, with Bengal which are still remained separated. This is not geographical unity or geographical division. There was life between people of every districts of Bengal and that they must realise before starting their work. In conclusion the speaker appealed to the audience to continue this agitation till they were successful in their noble mission.

Sjs. Krishna Kumar Mitter, Provat Chandra Ganguly, J. N. Biswas, Saja. lendra Nath Ray, Mr. Abdur Rahim and others also addressed the gathering strongly protesting against the separation and urging immediate amalgamation of the separatd district with Bengal.

Resolution protesting against the separation of Svlhet, Kachar and other districts from Bengal and urging their amalgamation were unanimously adopted in the meeting.

A boundary committee was also formed to survey all the districts in Bengal.

Acharya P. C Ray demanded Sylhet & Khachar Reunion with Bengal in a Presidential speech : The full content of it was reported in the Amrita Bazar Patrika dt........ is reprinted.–Editor

Courtsey : National Library, Archives, Kolkata

Press Statement

India's Sympathy with Soviet
Manifesto By Prominent Intellectuals

The following manifesto, signed by a large number of intellectuals of Bengal, headed by Acharya Prafulla Chandra Ray, has been issued calling for India's sympathy with Soviet Russia at this critical juncture.

The Nazi attack on the Soviet Union has opened a new and momentous phase in world history. The war of machine and of men regaes today on a colossal front and on a scale unheard-of before.

At this hour of trial we feel it is urgent that attentin is drawn to the massive moral and mateial achievement which the Soviets have to their credit. Some of us have been critical of aspect of the Soviet regime; some, again, do not support the theory of Marxism which the Soviets have attempted to put into practice. But when one remembers the dark legacy of Czarist misrule, which was followed for years by a disastrous Civil War and the intervention against the infant Soviets by nearly all the Powers on earth, the Soviet achievement can only be described as magnificent.

Rabindranath Tagore has testified to it in glowing terms, and since the two leading sociological investigators in the world to-day–Sidney and Beatrice Webb–brought out their book on "Soviet Communism–a new civilisation," information in regard to the U.S.S.R. has been both reliable and abundant.

COMPLETE EQUALITY

In the Soviet Union, all factories, mines, railways and shipping, land not for the profit of the few. The drama of Soviet planning cannot fail to grip even those who do not hold with socialist hypotheses. Complete equality of all citizens. irrespective of race or sex or nationality, enables them to participate in the business of the community.

Equal opportunity for education is provided universally, the school-leaving age is raised to seventeen, and payment is made to students at universities. Work is provided for all; unemployment does not exist; economic crises. recurrent everywhere else, have ceased. The maximum working day is 8 hours, the average less than 7. Free medical attention is provided for all; workers receive wages while sick, as though they are at work and are besides entitled to paid holidays every year. Nowhere in the world, as impartial observers testify, are women and children so well cared for as in the Soviet Union.

Majestic in conception, practical in detail, scientific in form, the Soviet Plans essay tasks never yet attempted by any State, ancient or modern.

SCIENTIFIC SPIRIT

"There is no country, we imagine, in which so large and so varied an amount of scientific research is being carried on at the public expense, alike in the realm of abstract theory and in that of technology. There is certainly none in which there is so little chance of that frustration of science by the profit-making instinct of which the British and American scientists are now complaining." (Soviet Communism).

We in India cannot forget how in one grand gesture after the Revolution the Soviets renounced all 'priorities' and 'capitulations' and 'concessions' and 'privileges' which the Czarist Governmenthad enjoyed in Asiatic countries along with the other Great Powers.

Scores of races and millions of people were condemned by the Czars to "planned backwardness," while the Soviet freedom for national and linguistic minorities has produced a high flower of culture, and a new intellectual life is astir on sites where superstition and dark ecclesteatical reaction once reigned supreme. For in the U.S.S.R., with its 185 peoples and 147 languages, there is no imposed privilege for a race or for a language.

EMANCIPATIN OF WOMEN

The first Mohammedan State to adopt legislation for women's emancipation was not Kemal's Turkey, but Soviet Azerbaijan. How different is Soviet Uzbekistan from the Bukhara Khanate, where there were 8,000 with-doctors and just one doctor for the Emir, his harem and his court.

As the Webbs point out, **"The Soviet Union has set itself. diffigently, not merely to treat the 'lesser breeds without the law' with equality. but recognising that their backwardness was due to centuries of poverty, repression and enslavement, has made it a leading feature of its policy to spend out of common funds considerably more per head on its backward races than on the superior ones, in education and social improvements, in industrial investiments and agricultural reforms."**

LOVE OF KNOWLEDGE

The figures for book-production in the U.S.S.R. are astronomical. At the end of the first Five-Year Plan, Soveiet book-production was greater than that of England, Germany and Japan taken together.

Einstein, bariished by the Nazis, sells more perhaps in the U.S.S.R., than anywhere else; between 1927 and 1936, 55,000 copies of his work were sold in the Union.

In the land of his birth, the 375th anniversary of Shakespeare's birth passed unnoticed,while the event was celebrated by workers and peasants everywhere inthe U.S.S.R. Some 200.00 people saw in Moscow the performance of "King Lear" in the spring of 1939. In the small republic of Armenia, 32,000 copies of Shakespeare sold in the last five years.

The Soviet people have no "cultured classes" in our sense of the term and want none. They seek a wholly cultured people and try to offer leisure, security and opportunity to all.

NEW CIVILIZATION

In a little over twenty years and in face of the most stupendous odds, the common people of the Soveit Union have created what we believe is a new civilisation. And even we in India, borne down by generations of inanity and degradation, cannot remain undisturbed when that civilisation is in peril. Helpless and unfree, we can at least send our good wishes to the Soviets and wait anxiously for the day when they will come out victorious over the forces arrayed against them.

The signatories to the appeal are :–
P. C. Ray
Satyendra Nath Majumdar
Rabindranarayan Ghosh
(Principal, Ripon College)
Hem Chandra Nag
(Editor, "Hindusthan Standard")
Mrinal Kanti Bose
("Amrita Bazar Patrika")
Dhirendra Nath Sen
("Amrita Bazar Patrka")
Vivekananda Mukherjee
(Editor, "Yugantar")
Pramatha Chaudhuri
Naresh Chandra Sen Gupta
Jamini Roy
Atul Chandra Gupta
Manik Banerjee
Tarashanker Banerjee
Amiya Chakravarti
Premendra Mitra
Buddhadev Bose
Sajani Kanta Das
Bishnu Dey
Biren Kumar Sanyal
Niren Roy

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* Hindustan standard July 20, 1941
Courtsey : National Library, Archives, Kolkata

Press Statement

Reply given by Acharya Sir Prafulla Chandra Ray to the Address presented to him by the Indian Chemical Manufacturers' Association

on 13th August, 1941.

MR. PRESIDENT AND FRIENDS,

I am particularly grateful to you all for the very kind words in which you have felicitated me this evening. But I must confess that I am hardly worthy of all that you have said about my services. I wish I could deserve them. I am fully conscious of what I could do for your Association, but this much I can say that I never failed to place my anxious moments at your disposal, whenever it became necessary. Bereft of the fire of youth, crippled by the weight of years, I am still a servant of yours and am indeed eager to serve you in whatever way I can'.

Gentlemen, I am indeed very glad to know that your strength is gradually increasing and in course of only three years or leas this infant Association has turued up to be a representative organisation, having members in the four corners of our vast mother-land. I havo no doubt that the remaining concerns, which have not yet joined the Association, would do so in due course and further strengthen the voice of the Indian Chemical Manufacturers' Association.

The Chemical and Pharmaceutical Industries have great possibilities in our land and I need not dwell much upon the theme. The disturbing factors are also groat. We require, in the first place, a liberal State policy to render all assistance to such enterprises and in the second, a sincere support from the public. I know that a large section of the people still have an inferiority complex whenever the question of choosing between foreign and home-made chemicals and medicines is concerned. This is a positive handicap for the growth of the industry. It should be removed by all possible means, by propaganda, demonstration and by raising the standard of our products, whereover necessary. All my life I havo tried to remove this inferiority complex; it had been my only wish to demonstrate that Indians could organise and establish chemical concerns to manufacture products which are in no way inferior to foreign goods. I had not been content to remain a mere theoretical man in the laboratory but tried during the best portion of my life to *give* chemical research a commercial and industrial turn. The success has not been and could not be phenomenal, but the preliminaries have been doen and it is to you that I rightly look in my old age for the final success. Only the fringe of the problem has been touched so far and there is still a large amount of work to be done.

You, my friends, are all experienced and tested business-men and manufacturers, and know perfectly well what we have to do. I therefore, hardly think it necessary for me to dilate on this matter. It is neither the time nor the occasion to do so. Without detaining your worthy President and you all any longer and taxing your patience with a long speech,. I conclude with my sincere and hearty thanks to you all.

Courtsey : Bengal Chemical Library, Kolkata

Press Statement

Equality of Trade rights

Sir. P. P. Roy's Rejoineder

Sir. P. C. Roy wrote the following letter to the "Statesman". It was published in this paper on the 14th instant and is referred to in our editorial article to-day:–

British Rights

To the Editor of the "Statesman." Sir,–In your leading article of February 11, you invite me to state that are the "privileges" enjoyed by British trade in India. I presume you are aware that the present British interests have established themselves on the ruins of Indian industries and on the basic of special privileges granted to European merchants,and of the monopolies of the East India Comnany led to the salt monopoly of the East India Company. How the salt monopoly of the Company led to the decay of the salt industry in Bengal is a matter of hisotyr. It is equally well known how the British teaplanters wore assisted in the early stages and how leases of mines and foresls have been given away to non-Indians often at ridiculously low rents. If the Indian public had access to all records of such transactions, they would be able to show cases wherein racial favouritism had been the decisive faetor. I have known of an instance in which one Indian made a geolocial survey of a certain area and submitted a report to the Government of India which was published after several years and meanwhile the best tracts were given away to Europeean companics preferential treatment of a simplicity future has been accorded to European colliery-owner as regards prospeeting licenses as well as facilities of railway sidings and waggon industry to this Instances of a similar nature could be multiplied indefintely. For the very fact that British travelers belong to the ruling great privilege. They can and have used political power to promete their economic interests in variable direct and indirect ways.

You state that British trade enjoy no advantage in the matter of taxatin or taritory railway rates. I would draw your attention to only one instance. Until and recently British industry raised in the legislative Assembly. In regards tariff rates, I wish you had not mentioned the coton industry because it is the moss important, exaple from your point of veiw. If there is one industry more than another in which the privileged position of the British has been utilized to throttle an indigenous industry, it is the cotton industy. It was no rabid Congressman but a British historican, H. H. Wilson, who pointed our how "the foreign manufacturer employed the arm of political injustice to keep down and ultimately strangle a competitor with whom he could not have contended on equal terms." By imposing prohibitive duties in England and keeping the Indian market free, the "vested interests" of British trader were established. I do not know how anyone in the face of the cotton excise duty which has been even officially admitted to be inequitable can cliam that British trade interests are established in this country by fair mehods, and open competion and without the assistance of the State. in the railway again. It is common knowledge that the rates are so adjusted and manipalated as to assist the export of raw materials and the import of mannufactured goods, that is, to aid non-Indian interests at the expense of Indian interests. Or take the ship-building and shipping in dustries. Their ruin was achieved by methods similar to chose adopted in the case of the cotton industry. The employment of the Indian-build and Indian manned ship was prohibited in the trade between England and India. On the other hand, British shipping enterprise in its intial stages was assisted through Government subsidy as non Indian inland, navigation companies have, I understand, private agreements will certain State railways for through traffic precluding similar agreement with other, that is Indian companies.

In banking also it is well known that racial diserimination is made in the matter of credit and Indian despite their assets do not receive the same treatment as European as regards facilities. Lala Harkishanlal in his evidence before the Indsutrial Commission stated that :

"I also know that an application was made by a European to an Anglo-Indian bank for loan and he was first asked to state that this loan would not benefit any Indian in any form or shape or any existing bank in any form or shape; and he was told that if he assured them of that the loan would be negotiated, otherwise not."

Similar instances of differential treatment are known to every business man and have been brought to the notice of the Banking Enquiry Committees. Moreover, as the exchange business was the monopoly of foreign bank, mostly British, the Imperial Bank was by the Act constituting it debarred from engaging itself in that kind of business while despite its being, in a sense, the bankers' bank, it was allowed to compete with the Indian joint-stock banks. This is another illustration of the unperceived yet real privilege enjoyed by British trade.

Lastly, the manner in which non-Indians have been assisted in starting and running public utility companies in the important towns of Indian shows what a "fair field" there is in the country. You are perfectly entitled to argue that the British rule of India is not exactly a matter of philanthrophy and that it is natural that Britishers as the ruling race should benefit by the political connexion of their country with this. But in that case the myth that all non-Indian vested interests are legitimately built up or that Indians suffer no handicaps because of their race and political subservience must be abandoned once and for all. Let the British candidly acknowledge that they are interested rulers or privileged traders–there is no alternative category–Yours, etc.

Source the Liberty, February 27, 1931
Courtsey : Bengal Chemical Library, Kolkata